

GOD AND SCIENCE: THE EFFECT OF WATER QUALITY ON THE HEALTH AND
WELL-BEING OF THE COMMUNITY OF WEST ORANGE, NEW JERSEY

By

MIGUEL ANGEL HERNANDEZ GUEVARA

A DEMONSTRATION PROJECT

Submitted to
New York Theological Seminary
in partial fulfillment of the requirements
for the degree of

DOCTOR OF MINISTRY

New York, New York, USA

2018

Abstract

GOD AND SCIENCE: THE EFFECT OF WATER QUALITY ON THE HEALTH AND WELL-BEING OF THE COMMUNITY OF WEST ORANGE, NEW JERSEY

By

MIGUEL ANGEL HERNANDEZ GUEVARA

Water is a resource needed for sustaining all living creatures. With the events reported about water contamination in Flint, Michigan, it is imperative for communities to be concerned about the quality of their drinking water. This Demonstration Project aims at create awareness about the Water Quality in West Orange, NJ, and the local communities. The site of the project was Holy Trinity Episcopal Church in West Orange, NJ. I delivered a sermon series at the church. I made multiple presentations about How to Understand the Water Quality Report of West Orange, NJ, at the church, and in the participation and collaboration with small interest groups about the environment and specifically Water Quality in New York and New Jersey. Consistent with my research, I opened an avenue of communication with the Township of West Orange and the NJ American Water company to gain access, understanding, and clarification of the Water Quality Reports for West Orange, NJ. Questionnaires in Spanish and English were distributed and the data was collected and analyzed. The small data sample showed that there is a crucial need for communities to be educated about water pollution in general. It was also revealed that Water Quality Reports are very complex and difficult to be understood by lay people, and its simplification is needed. Electronic media can be a vehicle to create an awareness campaign to inform the public about Water Quality.

To my mother, Maria Chicas Guevara, who supported me with my education during my formative days in El Salvador, and to my wife, Leonor Molina-Hernandez, who has supported my educational endeavors for the past ten years. Lastly, to my daughters: Mary E. Hernandez, Becky Ortiz, and Melissa Molina.

Acknowledgments

I would like to express the deepest appreciation to the members of the Site Team and Project Team for their support in executing the Water Quality project.

My thanks go to West Orange High School student, Ramiro Reynaga, for volunteering and helping during the planning and execution of the God, Science, and Art Summer Program at Holy Trinity Episcopal Church.

A thank you to Professor R. Douglas Bendall, Ph.D., at The Newark School of Theology, for introducing me to the academic world of Theology and The Episcopal Church.

I would like to express my gratitude to The Rev. Dr. Peter Jackson for his encouragement, editorial work during the writing stages of this demonstration project and for serving as my academic advisor.

I would like to thank Professor Brian Buckley at Rutgers University Environmental and Occupational Health Sciences Institute (EOHSI) for his expert opinion, and for testing the water at Holy Trinity in West Orange, NJ.

I would like to thank Mr. Victor Cirilo, a Township councilman in West Orange, NJ, for offering support for the project as he introduced me to Mayor Robert D. Parisi.

Thanks are due to Mr. Rodolfo Rodriguez, President of the West Orange Hispanic Foundation, for his support of the God and Science project.

In addition, a special thanks to Professor Tom Bryant for his support and skillful guidance in completing the demonstration project.

Table of Contents

CHAPTER 1 INTRODUCTION TO HOLY TRINITY EPISCOPAL CHURCH IN WEST ORANGE, NEW JERSEY	1
CHAPTER 2 PRELIMINARY ANALYSIS OF THE CHALLENGE – WATER QUALITY IN WEST ORANGE, NEW JERSEY	9
CHAPTER 3 AWARENESS OF WATER QUALITY – PROJECT IMPLEMENTATION IN WEST ORANGE, NEW JERSEY	15
CHAPTER 4 THE INFLUENCE OF WATER IN THE CREATION OF SOCIETIES..	66
CHAPTER 5 BIBLICAL AND THEOLOGICAL UNDERSTANDING OF WATER ..	76
CHAPTER 6 SOCIO-ECONOMIC IMPACT OF WATER IN COMMUNITIES.....	89
CHAPTER 7 EVALUATION PROCESS	97
CHAPTER 8 MINISTERIAL COMPETENCIES	101
CHAPTER 9 COMMUNITY TRANSFORMATIONAL OUTCOMES.....	119
CHAPTER 10 THE FUTURE WATER ISSUES AND CONCERNS	127
APPENDICES	132
APPENDIX A –DEMONSTRATION PROJECT PROPOSAL	133
APPENDIX B – SAMPLE OF SERMONS.....	179
APPENDIX C – WATER QUALITY PRESENTATION.....	186
APPENDIX D – SAMPLE OF QUESTIONNAIRES.....	203
APPENDIX E – SAMPLE OF ADVERTISEMENT	209
BIBLIOGRAPHY	210

List of Figures

Figure 1. Pascal's Triangle	42
Figure 2. Fibonacci's Spiral.....	43
Figure 3. Water Main Breaks.....	94

List of Tables

Table 1. Schedule of Tasks and Activities.....	19
Table 2. Regulated Substances	27
Table 3. Definition of Terms	27
Table 4. Response to Spanish Questionnaire.....	57
Table 5. Response to English Questionnaire	59

CHAPTER 1

INTRODUCTION TO HOLY TRINITY EPISCOPAL CHURCH IN WEST ORANGE, NEW JERSEY

Brief History of Holy Trinity Church

Holy Trinity Episcopal Church in West Orange, New Jersey, was incorporated on April 2, 1907, and celebrated its first Mass on Christmas Eve in the same year. The Rev. Otho Humphrey was the first rector. Holy Trinity Church was formed as an independent church from St. Mark's Mission Chapel.¹

It is important to mention that Holy Trinity was established to provide spiritual support to the residents of West Orange, NJ, at the time when the town enjoyed numerous job opportunities provided by the Thomas Edison laboratories, as well as other manufacturing companies in the West Orange Valley, and the adjacent City of Orange, NJ. The number of people who were employed by Thomas Edison laboratories and factory totaled "11,000 men and women during the First World War. In four years, that number had shrunk to fewer than 2,000."² According to the West Orange historian, Joseph Fagan, "Thomas Edison secured 1,903 U.S. patents in his life and endures as the

¹ Episcopal Church. Diocese of New Jersey, *History of the Episcopal Church in Essex County, New Jersey*,
<https://books.google.com/books?id=AyZGAAAAYAAJ&pg=PA69&lpg=PA69&dq=date+of+incorporation+Holy+Trinity+Church+west+orange+nj&source=bl&ots=xVPK8hr8d5&sig=7u9vSkeLgIgV1Xyd7TnANuUrzEI&hl=en&sa=X&ved=0ahUKEwis9fHg7e3WAhVI9YMKHYP1B0gQ6AEIPDAE#v=onepage&q=date%20of%20incorporation%20Holy%20Trinity%20Church%20west%20orange%20nj&f=false>
(accessed October 13, 2017).

² National Park Services, "Thomas Edison," <https://www.nps.gov/edis/learn/kidsyouth/edison-and-his-era.htm> (accessed July 21, 2017).

iconic image of West Orange” New Jersey.³ Thomas Edison lived in West Orange until his death in 1931. In a conversation with Mr. Bob Grey, one of the oldest members of the church, I learned that a group of retired ladies from the Thomas Edison Factory used to gather at Holy Trinity Episcopal Church for social functions under a grant left by Thomas Edison for retired women.⁴

Located in a primarily working-class neighborhood, Holy Trinity was a predominantly white congregation when it was founded in 1907. During the past 15 years, Holy Trinity has become a more diverse congregation that includes Whites, Blacks, West Indians, Africans, and Hispanics. One Afro-American family joined Holy Trinity over 32 years ago, which indicates that the church has evolved to become a multi-racial and multi-cultural congregation.

As expected, many of the priests in the early days were White males. However, as time progressed, several parish priests have been Black, Filipino, Indian (from India) and Hispanic. In addition, women have served the congregation as priests. During the past five years, the church has been under financial distress, which did not allow for a full-time priest. In the previous three and a half years before my arrival at Holy Trinity, the church was led by the lay leaders, with supply priests being recruited to officiate at the weekly church services. As a result, the parishioners did not receive the pastoral care needed for their spiritual well-being. I became the Priest-in-Charge of Holy Trinity in March 2014. Despite my arrival, the financial distress continues as the infrastructure of the buildings and equipment require maintenance and repairs.

³ Joseph Fagan, *Stories of West Orange* (Charleston, SC: The History Press, 2014), 80.

⁴ The conversation with Mr. Bob Gray took place in his residence at Cedar Crest in New Jersey in the presence of the Rev. Peter Jackson and the Rev. Miguel A. Hernandez.

According to a certificate of recognition given posthumously to the Rev. Christine Tremaine as a tribute by the West Orange Township Council, Holy Trinity was at the risk of being closed. In one of the statements it says that “Whereas, Rev. Christine Tremaine first began her association with Holy Trinity in 1997, left the state and returned in 2007, ready to help save the struggling church from closing.”⁵

In 1999, the Episcopal Diocese of Newark invited Holy Trinity Church to merge with two other parishes in the Oranges in NJ. Instead, the Rev. Christine Tremaine, the then Interim Vicar at that time, started two new ministries: The Soup Kitchen (now named Christine’s Kitchen), and the Holy Trinity West Orange Food Pantry. As a result of these initiatives, Holy Trinity was exempted from being considered part of the merger and was allowed to continue to minister in the West Orange area as an independent parish with a defined mission and identity connected to urban issues.

During 2013, another attempt was made for Holy Trinity Church to establish a working relationship in order to do ministry with St. Luke’s Episcopal Church in Montclair, NJ, (a more affluent community). After a year, the cooperation ended between the two churches. Since then, Holy Trinity has continued to minister in the West Orange community, and it is adding new areas of ministry.

Anglo-Catholic tradition

Historically, Holy Trinity Episcopal Church is of the Anglo-Catholic tradition and part of the worldwide Anglican Communion. Anglicanism “is the faith practice, and the spirit of the Churches of the Anglican Communion.”⁶ According to Professor J. Robert

⁵ The recognition of the Rev. Christine Tremaine, dated December 16, 2008 is posted at Holy Trinity Episcopal Church.

⁶ Stephen Sykes and John Booty, eds., *The Study of Anglicanism* (Philadelphia: Fortress Press, 1988), 405.

Wright, the term “Anglican has come to mean not simply ‘English’ or ‘pertaining to the Church of England,’ but also ecclesiastically and more broadly, ‘historically descended from the Church of England.’”⁷ This is reflected in the form of its worship services, which start with an acclamation, and the Collect for Purity based on Psalm 51. The prescribed lessons as indicated in the common lectionary are read as follows: A reading from the Old Testament (Hebrew Bible), a reading from the Psalms, a reading of an Epistle, and a reading from the Gospel.⁸ Note that the lectionary uses a three-year cycle to allow for a focus on different Gospel readings: Year A for Matthew, B for Mark and C for Luke. However, the Gospel according to John is used at different times throughout the three years.

The Sermon is delivered following the completion of the prescribed readings. The Prayers of the People and the General Confession are then offered. The Peace is exchanged and after this, the Eucharist, or Holy Communion is offered. At Communion, we consume the consecrated bread and share the one cup as a sign of unity in faith, taking our place in the one Body of Christ, the fellowship of all believers. This format of service is performed every time we come together to celebrate the Mass or the Eucharist. The priest is the spiritual leader during the service. However, when no ordained minister is present, a lay leader can perform the service using the rituals found in the *Book of Common Prayer* (BCP) for a given occasion.⁹ The current version of the BCP used in the

⁷ Ibid., 424.

⁸ The lectionary readings can be found at <http://www.lectionarypage.net/CalndrsIndexes/Calendar2016.html>.

⁹ Episcopal Church, *The Book of Common Prayer and Administration of the Sacraments and Other Rites and Ceremonies of the Church: Together with the Psalter or Psalms of David According to the Use of the Episcopal Church* (New York: Church Publishing, 1979).

United States is the 1979 version; the original version of the BCP was published in 1549 in England.¹⁰

Baptism is the sacrament by which new members are welcomed to the Episcopal Church. Water is poured on the candidate for Baptism while the celebrant utters “the words invoking the name of the Father, the Son and the Holy Ghost.”¹¹

The Cross is the main religious symbol at Holy Trinity Church. The Cross, which reminds us of Jesus’ sacrifice for us, precedes all processions in the church.¹² The Bread and the Wine are the two other important symbols in the Eucharist representing the Body and Blood of Christ. In the Eucharist, we are reminded that Jesus wants our company as guests at his supper.¹³ However, grape juice is also offered at Holy Trinity.¹⁴

The members of Holy Trinity Church are committed Christians who believe in sharing their resources with others. Theologically, they believe in the resurrected Jesus and the power of the Holy Spirit. I have observed that when preaching about the sacrifice of Jesus on the Cross, congregants tend to accept the message more readily than when the message has to do with economic or social issues in the world.

Ministries offered to the community

Holy Trinity serves the community through its various ministries: The Holy Trinity West Orange Food Pantry, the Soup Kitchen, the Thrift Shop, the Tutoring

¹⁰ Robert W. Prichard, *A History of the Episcopal Church*, rev. ed. (Harrisburg, PA: Morehouse, 1999), 4.

¹¹ Adrian Hastings, ed., *A World History of Christianity* (Grand Rapids, MI: W. B. Eerdmans, 2000), 127.

¹² Daughters of St. Paul, *Basic Catechism*, 6th ed. (Boston: Pauline Books & Media, 1987), 103.

¹³ Rowan Williams, *Being Christian: Baptism, Bible, Eucharist, Prayer* (Grand Rapids, MI: William B. Eerdmans, 2014), 41.

¹⁴ Grape juice is offered to children and people who do not drink wine.

Center, and the God, Science, and Art Summer Program. Holy Trinity supports in excess of 150 people per week in the above-mentioned ministries. It is important to mention that Holy Trinity Episcopal Church enjoys the support of numerous volunteers who come from diverse organizations, such as churches, synagogues, and other civic groups. People from the surrounding community come during the week to retrieve non-perishable food, and on Saturdays, people come to receive a hot meal for lunch at no cost. At the Thrift Shop, people come to buy items that are in gently used condition for a fraction of the regular price. During the winter, there is a coat drive in which gently used coats are sold cheaply. These ministries are mostly organized and run by volunteers under the guidance of the Priest-in-Charge (me) and the Executive Committee of the Church. In addition, Holy Trinity offers its dining hall space for outside organizations such as Alcoholics Anonymous (AA) meetings five times a week, and the West Orange Hispanic Foundations (WOHF), which meets once a month.¹⁵ Holy Trinity Church has extended its ministry. Since 2017, the Rev. Miguel A. Hernandez has been teaching seminary-level classes in Biblical Studies remotely from West Orange, NJ, to the *Seminario Episcopal Anglicano de El Salvador* (Episcopal Anglican Seminary of El Salvador). Our local slogan is: “Holy Trinity Church is a small church with a huge heart.” Holy Trinity Church is recognized as a community center where people come and enjoy company and have conversations as they participate in our aforementioned ministries.

Holy Trinity membership

The membership of Holy Trinity is very small; around 30-40 people attend the Sunday English language service at 9:30 a.m., and between 12 and 23 people attend the

¹⁵ A Spanish AA group has met twice a week since the beginning of 2017.

12:30 p.m. Spanish language service. In terms of demography, most of the members of Holy Trinity are Afro-Caribbean with a few Anglo families. The ages of the parishioners range from infant to 83 years old. There are about 16 children ranging in ages from 9 to 18 years old. However, most of the parishioners are over 60 years of age; from this group a small subset is at the helm of the leadership that makes Holy Trinity Episcopal Church chime with vibrations that keep the various key ministries moving forward. The income-level of the congregants falls within the category of middle class. In my estimation, the congregants are middle-income earners in the annual range of \$30,000.00 to \$70,000.00 (USD). There are a few members who live on a fixed income as retirees.

Organizational structure

The organizational structure of Holy Trinity Church is as follows: there is a Priest-in-Charge and an Executive Committee responsible for the daily operations of the church, including making payments to institutions and employees. The Priest-in-Charge is responsible for the spiritual well-being of church members and the liturgical planning during the church year. Under the Priest-in-Charge, there is a Deacon who has a leadership role that covers multiple functions, such as assisting in liturgical planning; assisting in religious services; preaching; and pastorally visiting homebound parishioners.

The members of Holy Trinity have been very supportive of this God and Science Water Quality Project. Three members from the congregation accepted the challenge and opportunity to be part of the Site Team and the Project Team, and as we continued to talk about the possibilities of the project, they offered ideas as to how to move the project forward. Other people who are familiar with the Water Quality issue in the community have become part of the Project Team.

All persons participating in the project are considered as contributors and stakeholders in the planning and implementation of the project as well as beneficiaries of the research outcome.

Selecting the appropriate site team and project participants for the Water Quality project was an important aspect of conducting the project within the community setting. Candidates for the site and implementation project teams were invited, and they were persuaded to participate in the project.

CHAPTER 2

PRELIMINARY ANALYSIS OF THE CHALLENGE – WATER QUALITY IN WEST ORANGE, NEW JERSEY

As a Priest of a 110-year-old church, Holy Trinity Episcopal Church in West Orange, NJ, and as a community advocate, I have concerns as reports indicate that the Water Quality in some surrounding towns has been compromised; tests have revealed high levels of lead in the water, making it unfit to drink. If this issue is not addressed, people in the community will most likely become ill. The demonstration project will create a public awareness campaign that will seek to educate the members of the church and the community at large about the potential danger of unsafe Water Quality in West Orange, and to encourage the development of sustainable solutions.

Ecological disasters are threatening human existence and nature in general.¹⁶ Historically, in the pursuit of progress, humanity has been using and at times exploiting the resources of nature to fulfill its physical needs for shelter, food, water, and other staples for survival, and to perpetuate its existence over the centuries. As the world's population has grown, reaching some seven billion, an expansion of finite resources has been needed to maintain the level of production of goods and services to provide for this ever-growing population. As a result, natural resources are being depleted, including fresh water.

In a report published in 2012 by The National Intelligence Council on Global Water Scarcity states that:

¹⁶ Paul Collins, *Judgment Day: The Struggle for Life on Earth* (Maryknoll, NY: Orbis Books, 2010) is a good reference to learn about the state of the ecological crisis in the world.

Many advances in agricultural production have been due to the unprecedented use of finite groundwater reserves. An estimated 99 percent of the Earth's accessible fresh water is found in aquifers, and about 2 billion people rely on groundwater as their sole source of water. Some groundwater is located in aquifers that are not renewable (fossil aquifers); in other cases, water extraction from aquifers exceeds the replenishment rate. Certain groundwater systems need multiple centuries to replenish. Total annual overdrafts from aquifers around the world are probably double the annual flow of the Nile River.¹⁷

When new products are made available, and technological advances are discovered, the environment pays a high price in the number and level of pollutants that are produced and released into the atmosphere, and into the water around the world.¹⁸ In the agrarian production of food, for example, composite chemicals used in fertilizers and pesticides contaminate the ground water supply, as well as runoff into lakes, rivers, and streams causing health issues to all living creatures. Thus, there is a growing amount of “evidence mounted that global harm could be inflicted by such human products as chemical pesticides or dust, the traditional belief in the automatic stability of biological systems faltered” causing a detrimental effect in the environment.¹⁹

In some places, water scarcity and inadequate water infrastructure can force people to consume water that is compromised. Under such circumstances, drinking unsafe water can affect the health of those drinking the water in many ways; for example:

Increasing the risk of waterborne diseases such as cholera, dysentery, and typhoid fever. During the dry season, as water supplies (including ground- and surface water) become more limited, concentrated pathogenic organisms increase the chance for outbreaks of waterborne diseases. These

¹⁷ United States Office of the Director of National Intelligence, *Global Water Security*, https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf (accessed October 31, 2017).

¹⁸ Catholic Church, *Laudato Si': On Care for Our Common Home: Encyclical Letter*, 2015, 18.

¹⁹ Spencer R. Weart, *The Discovery of Global Warming, New Histories of Science, Technology, and Medicine* (Cambridge, MA: Harvard University Press, 2003), 101.

dry season outbreaks typically portend explosive transmission of waterborne diseases—particularly cholera—in the rainy season when the total quantity of pathogen in the environment dramatically increases. Furthermore, water diversion projects (e.g., dams, reservoirs, and irrigation systems) cause waters to be stagnant or slow-moving, which creates favorable conditions for increased populations of disease-transmitting vectors such as mosquitoes (e.g., dengue, malaria), flies (e.g., onchocerciasis), snails (e.g., schistosomiasis), or copepods (e.g., Guinea worm). Water scarcity, and the inability to wash, directly results in skin infections and trachoma, the leading cause of preventable blindness.²⁰

To compound the situation, according to a The United Nations Educational, Scientific and Cultural Organization (UNESCO) report, it is known that:

Our water demands are rising sharply; (2) our ability to pollute is global; (3) our pollutants are more deadly; (4) our interference with ecosystems is both far-reaching and nefarious; and (5) all societies are closely interlinked so that any regional catastrophe can have global repercussions.²¹

As a result of this constant pollution of the earth through these processes, there is an urgency to address the issue of ecological and environmental contamination, destruction, and the degradation of the natural resources worldwide. The problem is global as well as local.

West Orange, NJ, can benefit by learning about what is happening to the Water Quality in its own community. Moreover, pollutants have become “part of people’s daily experience. Exposure to atmospheric pollutants produces a broad spectrum of health hazards, especially for the poor, and causes millions of premature deaths.”²²

It is a known that some towns in the USA, such as Flint in Michigan, have been impacted by political and economic policies that have affected negatively some poor

²⁰ United States Office of the Director of National Intelligence, *Global Water Security*.

²¹ United Nations Educational, Scientific and Cultural Organization (UNESCO), *Water History for our Times*, <http://unesdoc.unesco.org/images/0021/002108/210879e.pdf> (accessed July 27, 2017).

²² *Laudato Si'*, 18.

communities' Water Quality; the Water Quality has been deemed unsafe due to contamination. An understanding of the issues related to Water Quality is important for the people in communities that are at risk. Testing the Water Quality in disadvantaged communities is becoming crucial in order to make sure that the health of the people is protected.

It has been determined that nothing is more detrimental to human existence than the pollution of our water systems; water is fundamental to human existence and for all living beings. It is for this reason that I selected Water Quality as my topic since it is one of the most pressing issues currently facing every community worldwide. To demonstrate the severity of this issue in the context of the Flint, Michigan, water crisis, Virginia Tech University tested samples of water collected in that town and reported high levels of lead in those samples. The levels found in the water in Flint were on average 2,000 parts per billion (ppb), and the higher level was more than 13,000 ppb. That is far higher than the 15 ppb-level regarded as actionable by the United States Environmental Protection Agency (EPA).²³

The water problem disclosed in Flint, Michigan, has prompted concern about the Water Quality in West Orange, NJ, especially since children and young people are very vulnerable when exposed to high-levels of pollutants, such as lead in water.²⁴ However, lead is not the only pollutant in the water. It is well known that there are other pollutants that are detrimental to people's health. To generate awareness of the effects of this

²³ Mason Adams and Jesse Tuel, "Fighting for Flint: A Virginia Tech Team Exposes Lead Poisoning," *Virginia Tech Magazine* (Spring 2016), <http://www.vtmag.vt.edu/spring16/fighting-for-flint.html> (accessed July 27, 2017).

²⁴ There is a scientific debate about the level of lead in water. The EPA recommendation of 15 parts per billion (15 ppb) is considered to be unsafe. High levels of lead are considered a health hazard for children and pregnant women.

looming catastrophe, the God and Science project has strived to educate young people, and other members of the community about God's creation story and the necessity of taking action to mitigate the impact of those ecological disasters that could affect the Water Quality in our communities. The aim is to create an awareness of the possible pollutants that could be directly affecting people's health, and how this pollution of the planet relates to the consciousness of the biblical story about nature and its influence on people of faith.

In the Genesis story, humanity is given charge of the natural world. In a poetic and metaphorical form, man and woman are given the challenge and opportunity to till the land (Gen. 2: 15), and to take good care of the natural resources that were placed at their disposal. This implies that the man and the woman in the Garden of Eden were to work together to care and protect the endowment that was given to them so that future generations could enjoy the paradise that was originally created, free of contamination.

Caring for the ecology and the environment has social, political, economic, and spiritual dimensions. Most people currently live in urban areas. When our society consumes products, we become part of the problem of polluting the earth. Every time we buy something, waste is produced. Landfills are becoming so large that new industries are generated, such as waste management, to deal with it. The creation of jobs helps the economy to some extent. Politicians most likely support the creation of these new kinds of jobs. However, the number of chemicals used in the production of any product, from textiles to computer products, generates a large number of by-products that are detrimental to people's health, and which negatively impact the environment. The destruction of the environment also has a spiritual consequence. When people become ill,

they might question why and how they became ill. In ancient times, it was believed that “If one drank a glass of water, one might swallow a demon and become deathly ill, go insane, or drop dead.”²⁵ Depending on the person’s belief, one might think that he or she has sinned against God and that this is the reason for the illness. In other words, for some people punishment is the payment for sin. From this point of view, the person suffers spiritually. However, the cause of the illness might be contaminated water.

As has been presented in this analysis, the ecological and environmental decay in our society has multiple consequences that need to be addressed. The God and Science demonstration project aims at creating awareness as to what is happening to our environment, and especially to the drinking water in the area of West Orange, NJ.

The outcomes of the God and Science project will also include raising awareness of the current situation in terms of water contamination and how to address this issue. Another expected outcome will be to inform and influence children and young adults about the importance of science, mathematics, nature, and the care for the environment. Natural science will be presented as part of God’s creation story at Holy Trinity Episcopal Church in particular. During the execution of the Water Quality project, cooperation will be established with local leaders, community organizations and agencies that are interested in creating spaces to have meetings in which presentations and discussions can be made of the findings of the research, and to share the data with others so that they can become informed citizens.

²⁵ E. Glenn Hinson, *The Early Church: Origins to the Dawn of the Middle Ages* (Nashville, TN: Abingdon Press, 1996), 28.

CHAPTER 3

AWARENESS OF WATER QUALITY – PROJECT IMPLEMENTATION IN WEST ORANGE, NEW JERSEY

This chapter describes the awareness campaign that was implemented during the project ‘God and Science: The Effect of Water Quality on the Health and Wellbeing of the Community of West Orange, New Jersey’.

Formation of project team and strategy for execution

After the proposal for this project was accepted by New York Theological Seminary (NYTS) (see Appendix A), the first priority was finding candidates for the project team. I approached a number of people in the community to join the team. It took some effort to gather together the project team, and to inform them of the objectives of the project and their role and responsibilities as members of the project team in order to move the project forward. Once I had their commitments, I forwarded the project proposal to the project team members and invited them to the first meeting at which the project implementation strategy was discussed. In selecting the team members, I was mindful of the need to have as diverse a team as possible in terms of professional skills and interest, as well as cultural and geographic representations. Having a diverse team allowed for multiple ideas to be examined and implemented when considering all aspects of the demonstration project.

All meetings were held at Holy Trinity Episcopal Church. Attendance was mostly in person, with others joining via conference call since they were located in Long Island,

New York, and as far away as El Salvador, Central America.²⁶ At the first meeting, guidelines were drawn up regarding the specific roles and tasks required of the team. To keep track of the meetings, a team leader was selected to chair the meetings and provide a written record of the proceedings. Notes of the discussions of each meeting were circulated to the team.

At the meeting, all members of the team were introduced, after which the project proposal was studied. I answered questions as they were presented. For the most part, team members wanted to know the reason why the topic of Water Quality was selected. I spent time explaining the ravages that the community of Flint, Michigan, had suffered as a result of the contaminated water found in the city's potable drinking water supply. I stated that the aim of the project was to bring awareness to the local community of existing and potential contaminants in the water supply, and specifically of the main concern of having the heavy metal, lead (Pb), in the water supply in West Orange, NJ. At the time of the execution of the project, there was no actual evidence that the water was compromised in West Orange, NJ, but it was necessary to test the water since the city of Newark, NJ has been reported high levels of lead in its drinking water.

One of the members of the team suggested that the project should examine potential sources of contamination, as well as the origin and age of the utility infrastructure through which the water is delivered. The team discussed the various aspects of the project and finalized a strategy for its execution as follows:

²⁶ The conference services of FreeConferenceCall.com were obtained in order to accommodate the on-line gathering.

- 1) Contact The New Jersey American Water Company to obtain their Water Quality Reports.²⁷
- 2) Analyze their Water Quality Reports.
- 3) Contact the West Orange Public Works, the City Council chairman, as well as the city engineer to explain the objectives of the project.
- 4) Write a series of three sermons on the theme of water.
- 5) Formulate a questionnaire inquiring what people knew about the topic of local water quality.²⁸
- 6) Examine social media in which the Water Quality project could be advertised.
- 7) Speak at public forums in the community.
- 8) Design a flyer to invite people to the events, and to use the design of the flyer as a logo.
- 9) Regularly schedule review meetings with team leader.
- 10) Publish updates of the project report.
- 11) Establish a calendar of events that included the points listed above.

²⁷ The New Jersey American Water Company webpage can be accessed at <https://amwater.com/njaw/>.

²⁸ The questionnaire was designed to ascertain what people already knew about water quality. Since the congregation at Holy Trinity is both English and Spanish speaking, the questionnaire was offered in both languages.

Once the strategy was agreed on, based on the project proposal (see Appendix A), the planning and execution of the project were set in motion. The various activities, tasks and events that were undertaken are discussed in the subsequent paragraphs.

Project planning and schedule of events

According to a report written by the Hanover Research group, titled Best Practices Strategic Planning, there are a number of stages or steps that are essential to produce verifiable results. The most important stages for best strategic planning include, but are not limited to:

1) Formulating goals, objectives, and action steps; and 2) Monitoring the implementation, tracking progress, and revising the plan. During the initial planning process, comprehensive institutional research is critical in determining the appropriate goals and objectives.²⁹

In this regard, once the various events in the strategic plan were in progress, the project proposal was again reviewed by the demonstration team, especially in terms of the schedule for the completion of project activities. This reevaluation resulted in a shifting of projected completion dates since some of them did not seem as realistically attainable as first planned. In addition, New York Theological Seminary moved the target date to complete the dissertation to the first week in February 2018. As a result, the dates for the drafting, editorial changes and reviewing of the dissertation were revised so that the dissertation could be finalized during December 2017.

All the dates for the various tasks and activities necessary to implement the project were selected, working backward from the end date for completing the dissertation. Then, the dates for the writing of the sermon series were determined, and

²⁹ Hanover Research, “Best-Practices-in-Strategic-Planning” (Washington DC: Hanover Research, May 2014), https://intranet.ecu.edu.au/__data/assets/pdf_file/0004/711499/Hanover-Research,-Best-Practices-in-Strategic-Planning,-May-2014.pdf (accessed September 21, 2017).

dates for the presentations were chosen so that the stakeholders would be available.

Finally, the dates to address the City Council in West Orange, NJ, were chosen. When an event was undertaken, I discerned that a number of other related events emanated from it.

This is a natural outgrowth of project management. Table 1 shows the updated plan of execution that was strictly followed. Given the requirements to execute the project on time and to achieve the strategic goals and objectives the following target dates were chosen:

Table 1. Schedule of Tasks and Activities

Date	Task / Activity
12/28/16	First Conference Call with Project Team
2/6/17	Email to the New Jersey American Water Company
2/21/17	Meeting with academic advisor
3/9/17	Project Team consolidation
3/9/17	Production of the first YouTube video
3/11/17	Completion of Questionnaire
3/18/17	Short presentation at the ESL / Tutoring class Holy Trinity
3/19/17	Sermon 1 - Delivered at Holy Trinity in West Orange, NJ
3/22/17 - 3/24/17	Water Justice at Trinity Institute in NYC
3/26/17	Sermon 2 - Delivered at Holy Trinity in West Orange, NJ
3/26/17	Ecumenical training session with GreenFaith ³⁰ in Summit, NJ
5/5/17	Presentation 1 – West Orange Hispanic Foundation (Holy Trinity)
5/19/17	Project Review
5/23/17	Contact Health Department of West Orange, NJ
5/26/17	Water Test - Aqua Pro-Tech Laboratories
6/4/17	Presentation 2 – Holy Trinity (Spanish congregation)
6/10/17	Water Test 1 - Environmental Labs from Rutgers University
6/11/17	Sermon 3 - Delivered at Holy Trinity in West Orange, NJ
6/12/17	Water Test 2 - Environmental Labs from Rutgers University
7/11/17	Attendance to Town Council Meeting in West Orange, NJ
7/13/17	Visit to Rutgers University
8/14/17	Start writing Dissertation
10/30/17	Completion of Draft Dissertation
11/1/17	Submit Dissertation for editorial comments
12/15/17	Completion of Dissertation

³⁰ GreenFaith is an interfaith environmental organization based in New Jersey.

Obtaining the Water Quality Report from the NJ American Water Company

The initial investigative contact with the NJ American Water Company was accomplished by accessing the company's webpage (<https://amwater.com/njaw/>). Upon gaining access to the main page on the website, it took some time to become familiar with the data that was presented. In order to find the Water Quality reports, the zip code of the specified municipality is entered in the box labeled "Water Quality Reports." For example, in the case of the Town of West Orange, NJ, the zip code entered was 07052.

The Water Quality Report displayed on the NJ American Water Company is that of the previous completed calendar year. For example, the most current report shown is for the year 2016. Originally, the first report obtained was for year 2015. At that time, access to the Water Quality Report was not difficult. However, for the subsequent year, 2016, problems were encountered to gain access to the Water Quality Report for that year.

When I entered the zip code for the Town of West Orange, NJ, the web page just refreshed itself. I communicated via email with the NJ American Water Company to inform them about the difficulty I was encountering accessing their water report for 2016. After a few emails were exchanged, the NJ American Water Company corrected the problem. It is important to mention that gaining access to the Water Quality Report would have been easier by just entering the zip code, instead of having to click through many web page links. The representative from the NJ American Water Company was responsive to my request, and promised to correct the problem. However, even though the request was made for the Water Report labeled with the name for The Town of West

Orange, the water report that one was directed to was still named: Short Hills, which is a different and more affluent community.³¹

From this interaction with web technology, I have arrived at the following conclusions: 1) Data posted on-line might not be easily accessed, or viewed; 2) People with minimal computer literacy may be deterred from continuing to pursue the data search for specific Water Quality Results; 3) One must be persistent in order to access and check the Water Quality Reports, and the Alerts that the NJ American Water Company posts regularly. In addition, consumers must continue to monitor the updates and “Alerts” published on the web page with new postings, and when inconsistencies are uncovered they must be reported to the NJ American Water company. The Township of West Orange, NJ, must actively monitor the Water Quality Report postings on a regular basis, and request the NJ American Water Company to correct issues with the web access of their Water Quality Reports.

Tools for Analyzing the Water Quality Report

After obtaining a Water Quality Report, the logical next step is to analyze the data contained therein. That, however, can be a challenge, because the chemical nomenclature and technical parameters are somewhat intimidating for a non-professional, or someone who is not a technical specialist in the field.³² A list of contaminants tested, the concentrations, and, in some cases some clarifications, are provided in the Water Quality Report. In addition, for someone who is learning to effectively navigate the Water Quality reports, it is imperative to learn as much as possible about the subject,

³¹ New Jersey American Water, *2016 Water Quality Report: Short Hills System*, <http://www.amwater.com/ccr/shorthills.pdf> (accessed October 21, 2017).

³² This indicates that educational institutions as well as public health agencies should educate the public on the chemicals that are encountered in most communities.

specifically the terms and applicable definitions. This chapter presents explanations to help in the understanding of some of the terms and definitions used in Water Quality Reports. Additionally, colleges and universities are currently producing instructional materials to assist interested people in the community to interpret such accessible public health material.

The University of Illinois at Urbana-Champaign produced a brochure of their 2015 water report, indicating that “as water travels over the surface of the land or through the ground, it can dissolve naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animal or human activity.”³³ The brochure also presented some of the substances that may be present in source water:³⁴

- **Microbial Contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife;
- **Inorganic Contaminants**, such as salts and metals, which may be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;
- **Pesticides and Herbicides**, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses;
- **Organic Chemical Contaminants**, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum

³³ Illinois-American Water Company, *2015 Water Quality Report*, https://www.fs.illinois.edu/docs/default-source/safety-compliance/2015-water-quality-report_final.pdf?sfvrsn=4 (accessed September 30, 2017).

³⁴ Ibid.

production, and may also come from gas stations, urban storm water runoff and septic systems; and

- **Radioactive Contaminants**, which may occur naturally or result from oil and gas production and mining activities.

Having knowledge of the above substances is important for raising awareness of the potential pollutants in the drinking water of communities. Using cosmetics, pharmaceuticals, and chemical products at home directly impact the water supply if the disposal of these products is not properly handled. Industrial and/or agricultural processes may also negatively affect the water quality of streams feeding aquifers.

Penn State University provided some relevant points that should be considered when examining the data of a Water Quality report; “milligrams per liter (mg/l) of water are used for substances like metals and nitrates. A milligram per liter is also equal to one part per million (ppm)--that is one part contaminant to one million parts water.”³⁵ This clarification aids in understanding the Water Quality report. There are cases in which a different measurement scale is implemented, such as the “extremely toxic substances like pesticides, for which the units used are even smaller. In these cases, parts per billion (ppb) are used.”³⁶ To measure Radon for example, the picocuries per liter are used, while values like pH, hardness, conductance, and turbidity are reported in units specific to the tests.³⁷

³⁵ Pennsylvania State University, Penn State Extension, “How to Interpret a Water Analysis Report,” <https://extension.psu.edu/how-to-interpret-a-water-analysis-report> (accessed September 21, 2017).

³⁶ Ibid.

³⁷ Ibid.

There might be other units found on some test reports; in that case it is important to read the comments provided in the laboratories' results.

Analysis of the West Orange Water Quality Report

In opening the Water Quality Report for West Orange, NJ, from the NJ American Water Company webpage, there is a lot of material to be understood.³⁸ The first two pages provide general information about the company, and there are instructions for customers. In fact, the NJ American Water Company invites its customers to get involved by:

- Reading the information provided in bill inserts and special mailings
- Contacting the company directly with questions or to discuss issues
- Responding to company requests for participation in focus groups and roundtables
- Attending open houses conducted by the company
- Responding to survey requests

There are additional definitions of terms that need to be known to understand the Water Quality Results. The New Jersey American Water Company provides the following definitions:

- **Pathogens:** Disease-causing organisms such as bacteria and viruses.
Common sources are animal and human fecal wastes.
- **Nutrients:** Compounds, minerals and elements that aid growth and that are both naturally occurring and man-made. Examples include nitrogen and phosphorus.

³⁸ New Jersey American Water, *2016 Water Quality Report, Short Hills System*.

- **Volatile Organic Compounds:** Man-made chemicals used as solvents, degreasers, and gasoline components. Examples include benzene, methyl tertiary butyl ether (MTBE), and vinyl chloride.
- **Pesticides:** Man-made chemicals used to control pests, weeds, and fungus. Common sources include land application and manufacturing centers of pesticides. Examples include herbicides such as atrazine, and insecticides such as chlordane.
- **Inorganics:** Mineral-based compounds that are both naturally occurring and man-made. Examples include arsenic, asbestos, copper, lead, and nitrate.
- **Radionuclides:** Radioactive substances that are both naturally occurring and man-made. Examples include radium and uranium.
- **Radon:** Colorless, odorless, cancer-causing gas that occurs naturally in the environment.
- **Disinfection By-product Precursors:** A common source is naturally occurring organic matter in surface water. Disinfection by-products are formed when the disinfectants (usually chlorine) used to kill pathogens react with dissolved organic material (for example leaves) present in surface water.

The New Jersey American Water Company provides additional terms that are important in understanding the Water Quality Report:

- **90th Percentile Value:** Of the samples taken, 90% of the values of the results were below the level indicated in the table.

- **Action Level:** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
- **NA:** Not applicable.
- **ND (None Detected):** Laboratory analysis indicates that the constituent is not present.
- **ppb (Parts per Billion):** Corresponds to one part substance in one billion parts of water.
- **ppm (Parts per Million):** Corresponds to one part substance in one million parts of water.
- **pCi/L (Picocuries per Liter):** A measure of the radioactivity in water.
- **RUL:** Recommended upper limit

An understanding of all the terms and definitions is essential to be able to effectively interpret the Water Quality Report. Therefore, special attention should be paid to them.

The Water Quality Report should be read with caution. In the table below, locate the term Contaminant, and read across from left to right. The second column shows the Unit followed by the columns named MCL, MCLG, Range Detected, Highest Range Detected, Compliance Achieved, and Typical Source.

Table 2. Regulated Substances

Contaminant	Unit	MCL	MCLG	Range Detected	Highest Detected Level	Compliance Achieved	Typical Source
Disinfectant By-Products – Stage 2 Data							
Total Trihalomethanes (TTHM)	ppb	80	NA	10.1 - 93.1	74.3 ^{1,2}	YES	By-product of drinking water disinfection
Five Haloacetic Acids (HAA5)	ppb	60	NA	4.4 - 38.3	30.1 ¹	YES	By-product of drinking water disinfection
Disinfectants							
Chlorine	ppm	MRDL = 4	MRDLG = 4	0.50 - 1.00	1.2 ³	YES	Water additive used to control microbes
Chloramine	ppm	MRDL = 4	MRDLG = 4	0.5 - 1.2	1.2 ³	YES	Water additive used to control microbes
Inorganic Contaminants							
Chromium (total)	ppb	100	100	ND - 1.2	1.2	YES	Discharge from steel and pump mills; erosion of natural deposits
Fluoride ⁴	ppm	4	4	0.087 - 0.73	0.73	YES	Erosion of natural deposits; Water additive which promotes strong teeth
Nickel	ppb	NA	NA	ND - 8	8	NA	Erosion of natural deposits
Nitrate ⁵	ppm	10	10	0.24 - 5.81	5.81	YES	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Selenium	ppb	50	50	ND - 0.74	0.74	YES	Erosion of natural deposits
Treatment By-Products Precursor Removal							
Total Organic Carbon	ppm	TT	NA	0.76 - 3.19	3.19	YES	Naturally present in the environment
Radiological Contaminants							
Alpha emitters ⁶	pCi/L	15	0	ND - 12.0	12.0	YES	Erosion of natural deposits
Combined Radium ⁶	pCi/L	5	0	ND - 2.1	2.1	YES	Erosion of natural deposits
Tap water samples were collected for lead and copper analysis from homes in the service area							
Lead and Copper	Unit	Action Level	MCLG	Amount Detected (90th Percentile)	Compliance Achieved	Number of Samples Above Action Level	Typical Source
Lead ⁶	ppb	15	0	3	YES	2	Corrosion of household plumbing systems; Erosion of natural deposits
Copper ⁶	ppm	1.3	1.3	0.406	YES	1	Corrosion of household plumbing systems; Erosion of natural deposits

To facilitate the effective reading of the Water Quality report, the next table shows the definitions of the terms used by the New Jersey American Water company, and provides the meaning of the terms. *Note that these terms are guidelines only.*

Table 3. Definition of Terms

Term	Meaning
Unit	A standard used for measurements
Contaminant	A polluting substance in the water
MCL	The highest level of a contaminant that is allowed in drinking water
MCLG	The level of a contaminant in drinking water below which there is no known or expected risk to health
Range Detected	The highest and lowest test results for the year
Highest Range Detected	The highest test results during the year
Compliance Achieved	A “Yes” means the amount of the substance met government requirements
Typical Source	Usual origin of the substance

As illustrated in table 3, most of the levels of the tests are within compliance range as indicated by the entry “Yes” in the column “Compliance Achieved.” Under Nickel, the entry shows a “NA” in the columns “MCL”, “MCLG”, and “Compliance Achieved,” indicating that this substance has no requirement for compliance. This notation implies that customers need to learn more about the effects that this metal can have on their health. Be aware that when the “MCL” reading is above the required level, the Water Quality must be monitored. Note that the “Yes” in the table is an important parameter since it shows compliance.

As we read the Water Quality report, it is imperative to also read the notes provided at the bottom of the tables, as shown in table 3, since additional relevant details are provided. For example, the New Jersey American Water Company points to some important aspects of the effects of some contaminants on the health of consumers. The following list highlights the most relevant useful information in understanding the effects of the contaminants in the water:

- Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.
- Highest Detected Level is the maximum monthly average detected at the point of entry. Range indicates the average values detected in the distribution system.
- Fluoride is added to the water at therapeutic levels (0.6-1.0 ppm) in certain areas.

- Nitrate in drinking water at levels above 10 ppm is a health risk for infants less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask for advice from your health care provider.
- The state of New Jersey allows us to monitor for some substances less than once per year because the concentrations of these substances do not change frequently. Some of our data, though representative, is more than one-year-old.

In terms of lead (Pb), the New Jersey American Water Company indicates that “if present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children.”³⁹ As one can observe, the acquired contaminants in water may have detrimental health effects for consumers. Thus, citizens need to be vigilant and test the water they consume on a regular basis, as the purity of water varies as it flows through the distribution system where it comes in contact with foreign objects and substances. This is an expense that the consumers have to assume if they wish to test the quality of their drinking water on a regular basis.

In the past few years, there have been concerns over substances in the water that are labeled emerging contaminants or contaminants of emerging concern (CECs) that the public should know about. These contaminants can enter the drinking water supply in some communities. The Water Resources Research Center, College of Agriculture and Life Sciences, at The University of Arizona has produced a document which states that

³⁹ Ibid.

“The United States Geological Survey (USGS) provides a useful definition of CECs: “any synthetic or naturally occurring chemical or any microorganism that is not commonly monitored in the environment but has the potential to enter the environment and cause known or suspected adverse ecological and/or human health effects.”⁴⁰

Ignored or uninvestigated public health effects as a result of water contamination in any given community can go on for many years. In part, the problem could be due to the absence of new analytical methods to test for those contaminants and the inability of existing instruments to do so. Special instrumentation may therefore be needed to detect the presence of these new contaminants in the water. On the other hand, as substances are flushed, washed down, or discarded into kitchen sinks, the emerging contaminants, or contaminants of emerging concern can end up in streams, soil, rivers, and flow into aquifers that provide the drinking water in communities. Citizens have to take responsibility for properly disposing these products so as to positively affect the environment. For New Jersey, the Department of Biological Sciences of the Faculty of Arts and Sciences-Newark Rutgers, the State University of New Jersey, in a 2012 report to the New Jersey Dept. of Environmental Protection, states that:

A number of these chemicals may find their way into the state’s wastewater treatment facilities, receiving waters, aquifers and drinking water treatment facilities and other chemicals may be released to air or deposited in soils.⁴¹

⁴⁰ Water Resources Research Center, College of Agriculture and Life Sciences, The University of Arizona, “Contaminants of Emerging Concern in Water,” *Arroyo* (2013), https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/Arroyo2013LR_0.pdf (accessed September 23, 2017).

⁴¹ Science Advisory Board to the Commission or the New Jersey Department of Environmental Protection, *Final Report of the Contaminants of Emerging Concern Work Group of the New Jersey Department of Environmental Protection Science Advisory Board*, <http://www.state.nj.us/dep/sab/CECFramework%20Final%20Report.pdf> (accessed September 23, 2017).

To sum up, the emerging contaminants or contaminants of emerging concern can be categorized as:

Pharmaceuticals (both prescription and over-the-counter drugs), personal care products, plasticizers, flame retardants, and pesticides. Other categories describe their nature, such as surfactants, which can be used in detergents to aid grease removal and in cosmetics as an emulsifier; or synthetic hormones, which mimic the action of natural hormones.⁴²

Within this framework, to effectively analyze the Water Quality Report is not an easy task, as it might take more time and informed expertise to properly understand it. In general, the risk of being exposed to numerous types of general and specific contaminants is real, and measures should be taken to inform and better educate the general public. As concerned citizens, people should read and analyze the Water Quality Reports regularly to understand what is being reported and to understand how the presence of contaminants in the drinking water can cause public health hazards that could directly affect their health and well-being.

The University of Illinois at Urbana-Champaign's brochure states that "immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections."⁴³ This statement is a cautionary advisory for those who could be negatively impacted by consuming water that has been compromised with pollutants. For people with scarce economic resources, this is an additional burden, since they are required to seek recurring medical care, or be subject to laboratory testing on a continuing basis.

⁴² Ibid.

⁴³ Illinois-American Water Company, *Water Quality Report 2015*.

According to New Jersey American Water, the Short Hills System is a public community water system consisting of 25 wells, 4 surface water intakes, 12 purchased ground water sources, and 3 purchased surface water sources. The report adds that source water comes from the following aquifers and/or surface water bodies: The Passaic River, the Brunswick aquifer, and the Canoe Brook.⁴⁴ This means that the sources of contamination might be varied, making it imperative for the water sources to be tested on a regular basis.

Communication with West Orange Public Works, The City Council, and the Office of the Mayor

In an effort to obtain information about the Water Quality Report of the Town of West Orange, NJ, I contacted, via e-mail, the West Orange Assistant Director of Public Works. In the correspondence, which is reproduced below, I introduced myself and set out the purpose of the email:

“I am currently pursuing a Doctoral Degree in Ministry (D.Min.) from the New York Theological Seminary (<http://www.nyts.edu>), and I endeavored to mount an awareness project on the Water Quality of West Orange, NJ. I am requesting a copy of the most recent Water Quality Report of West Orange, NJ. I have looked in the Town’s web page (<http://www.westorange.org>), but I cannot locate any reports on the Water Quality.”⁴⁵ The e-mailed reply from the Assistant Director was one line stating: “Rev Miguel, the Township does not have their own water supply; it’s done by New Jersey American Water.” In my reply to the Assistant Director of Public Works, I indicated that

⁴⁴ American Water, *Short Hills*.

⁴⁵ The email correspondence was sent on January 31, 2017. A reply was received from the Assistant Director of Public Works in West Orange, NJ, on the same day.

I was going to directly contact the New Jersey American Water Company. Thus, an appropriate identified contact was established through our e-mailed responses.

On February 6, 2017, I sent an email to the Water Quality Compliance Officer at New Jersey American Water. After introducing myself, I stated that I was pursuing a Doctoral Degree in Ministry (D.Min.) from the New York Theological Seminary (<http://www.nyts.edu>), and I have elected to mount an awareness project on the Water Quality of West Orange, NJ. I also stated that I was formally requesting a copy of the most recent Water Quality Report of Town of West Orange, NJ, and that the Assistant Director of Public Works in West Orange, NJ, had provided the name of his company. The Customer Service Office of the New Jersey American Water Company replied via email on February 6, 2017, directing me to the company website to obtain the Water Quality Report of the Town of West Orange. This relationship with the New Jersey American Water Company proved productive as I was eventually provided with a copy of the 2016 Water Quality Report.

As I continued to amass support for the God and Science Water Quality project in West Orange, NJ, I spoke to Mr. Victor Cirilo, City Council Member, about the efforts to disseminate information about the Water Quality, and he offered to contact Mr. Robert Parisi, Mayor of West Orange. In an email addressed to Mayor Parisi, dated February 28, 2017, Mr. Cirilo initiated inquiry to ascertain if there was someone at the West Orange Health Department who could assist me in obtaining this information and other questions that that I could pose on Water Quality. As a result of this, Mayor Parisi provided the contact information of the office of the West Orange Health Department, and I was offered substantive assistance. For example, a link in the Town's webpage provided

access to the New Jersey American Water Company website where I obtained the Water Quality Report for year 2016.⁴⁶ The relationship that was established with the Health Department of West Orange, NJ, continued during the research and production of this project and its documentation.

Sermon preparation and delivery

I wrote three sermons on the theme of water as essential to sustaining life in English and translated them to Spanish (see Appendix B). Copies of the first sermon in English and Spanish are attached. The first sermon was delivered on March 19, 2017; the second on March 26, 2017; and the third on June 11, 2017. The preparation of the sermons required extensive planning as, in the Episcopal Church, the lectionary which dictates the biblical theme is used for each Sunday. I examined and selected carefully the prescribed lessons for each Sunday in which the theme of water was mentioned as essential to life to draft the sermons. In addition, the schedule had to be negotiated with the Rev. Dr. Peter Jackson, Archdeacon, since he prepares a sermon for each third Sunday of the month. The sermons included some important points about the problem of water pollution in our communities. In this regard, “the preacher has the unique responsibility to stand tall in the midst of our moral confusion, our spiritual estrangement, and our lost opportunities and to declare God is with us in our situation.”⁴⁷ It is important to note that “when we fail to address these concerns, they do not go away. They become compounded and are exploited for the benefit of someone who gains from the neglect.”⁴⁸

⁴⁶ Township of West Orange, “NJAW West Orange Water Quality Report,” <http://www.westorange.org/civicalerts.aspx?aid=1258> (accessed September 23, 2017).

⁴⁷ Samuel D. Proctor, *Preaching About Crises in the Community* (Philadelphia: Westminster Press, 1988), 11.

⁴⁸ *Ibid.*, 19.

In addition, one sermon was recorded with audio only, while the last sermon was video recorded and posted on YouTube.

Public presentations of the Water Quality Project

There were numerous opportunities to make presentations at various locations on the God and Science Water Quality project in West Orange, NJ, as part of the awareness campaign.

At the ESL/Tutoring class at Holy Trinity Episcopal Church, on March 18, 2017, I spoke to an audience comprised of adults and children about the Water Quality project I was working on. All the students present were very interested in the project. So, I explained to them that the water in cities like Flint in Michigan, as well as in Newark, New Jersey, had tested positive for lead (Pb). As I explained the issue, a young girl told me that she knew that the water was polluted and that we should use water filters. This conversation proved to me that there was an awareness and that the theme of Water Quality was important. I also provided some ideas on how to prevent the drinking of potentially contaminated water. I spoke about the process and benefits of filtered drinking water and distilled water. The same young girl told me that she knew about those processes. We drew a small model of some of the devices that were instrumental in cleaning tap water.

During attendance at the Water Justice Trinity Institute program in NYC (March 22-24, 2017), I participated in small groups of participants who were interested in the issue of clean water.⁴⁹ After the participants were presented with some important points about the essentials of being deeply involved in environmental programs or projects, I

⁴⁹ Trinity Church, "Trinity Institute 2017: Water Justice, March 22–24, 2017," <https://www.trinitywallstreet.org/trinity-institute/2017/home> (accessed September 29, 2017).

was given five minutes to speak about what I was doing in my community about the issue of water quality. During this interaction, I spoke about the Water Quality project that I was working on in West Orange, NJ. I informed the group that I was concerned about the reports that were being produced about the Flint, Michigan water supply, and in some cities in New Jersey, such as Newark. The presentation was principally a platform to bring awareness about Water Quality to places where I was given the opportunity. This small gathering of about seven people was very receptive to the project, and they offered relevant suggestions.

On March 26, 2017, I was invited to participate in an ecumenical training session in Summit, NJ, planned by the organization, GreenFaith.⁵⁰ The training lasted about four hours. There were presentations, strategies for launching environmental projects in the community, as well as group sessions. In the group that I was assigned to participate in, I had the opportunity to speak about my effort in bringing awareness about water quality in West Orange, NJ. I shared with the group that I had found a report in the West Orange Library and on-line that stated that the Environmental Protection Agency (EPA) had tested water wells in the area, and that the wells were subsequently condemned as they contained dangerous pollutants. The report named the chemicals: tetrachloroethylene, trichloroethylene and cis-1,2-dichloroethylene as part of the discovery. It then explained that “exposure to these common industrial solvents can have serious effects on people’s health, including liver damage and an increased risk of cancer.”⁵¹ I also shared with the

⁵⁰ Greenfaith, <http://www.greenfaith.org/> (accessed October 1, 2017).

⁵¹ United States Environmental Protection Agency (EPA), “EPA Adds Areas of Orange and West Orange, N.J. to the Superfund List” (September 14, 2012), <https://yosemite.epa.gov/opa/admpress.nsf/3881d73f4d4aaa0b85257359003f5348/33fd23ed1db52e9285257a7900647528!OpenDocument> (accessed October 1, 2017).

group that I was learning much about the presence of contaminants in water for the presentations that I was going to make on “How to Understand the Water Quality Report of West Orange, NJ.”

I completed two presentations at Holy Trinity in West Orange, NJ. The first presentation was made at the monthly gathering of the West Orange Hispanic Foundation (WOHF) on May 5, 2017.⁵² The presentation was planned to be delivered in English, but because there were people in the audience who did not understand English, I chose to offer the presentation in a bilingual format of (English and Spanish) even though the Power Point presentation was written in English. The second presentation was done for the Spanish-speaking congregation. For these two presentations, a Power Point presentation was made (Appendix C). The slides of the presentation showed how a person could get access to the webpage of the Town of West Orange, NJ, and from there navigate to the New Jersey American Water Company webpage (<https://amwater.com/njaw/>). This was a step-by-step process. Explanations were made about where to enter the zip code for West Orange, and how to access the site where the Water Report for West Orange was located under the name “Short Hills.” Once the report was accessed, important points were emphasized on the various contaminants identified and the compliance notes in the water report. After the water report was presented, the presentation provided a link to show the participants how they could find out the date their dwellings were built. I then showed the steps needed to obtain the relevant information. In conclusion, I drew attention to four important precautions to be observed

⁵² The Hispanic Foundation of West Orange meets monthly at Holy Trinity Episcopal Church offering talks on various topics that are important to the community. Additional information about the Hispanic Foundation of West Orange can be obtained from <http://www.westorangehispanicfoundation.org/>.

before using the water at home for food preparation: 1) To have the water tested for contaminants; 2) To let the water faucet run for about two minutes before the water was used for cooking; 3) Not to use hot water from the faucet since it could have excessive levels of lead (Pb) and; 4) When possible, to install or to use water filters for the water used for cooking and drinking.

I was invited to speak at the July 11, 2017, Town Council Meeting in West Orange, NJ, about the God and Science Water Quality project. I presented some of the findings of my research and of the project. Among the issues that I spoke about was that the public in general was not aware of the issues relating to with water quality. I spent some time explaining what I had been doing in terms of bringing awareness to the community by making presentations on “How to Understand the Water Quality Report of West Orange, NJ.” In addition to this, I presented the essential fact that it is important to know the year that the properties were built and to ascertain if the internal pipes in those buildings were made of lead. I also informed the City Council that people were given important precautions to follow when using tap water for cooking and drinking. The City Council was very interested in learning more about the outcome of this project. Mr. Victor Cirilo, West Orange City Council member indicated that it was the owner’s responsibility to test for lead in their homes or buildings. I also informed the meeting that Holy Trinity Episcopal Church has been introducing children and young adults to the area of God and Science for the past four years, and that this year the Church was partnering with Rutgers University to professionally test the local water quality.

Rutgers University Cooperation

On February 22, 2017, I established contact with the Community Outreach and Engagement Coordinator of the Environmental and Occupational Health Sciences

Institute (EOHSI) at Rutgers University in New Jersey.⁵³ The reason for the communication with Rutgers University's Environmental Laboratories was to seek their technical assistance for testing the purity of the drinking water in West Orange, New Jersey.

In an email, I stated that I had been told that the water company had promised to provide an assay that the Lead levels were within EPA compliance. However, if the Lead levels were elevated at the house or church, the owner/guardian is responsible for testing the water and to remediate the problem. I also indicated that Holy Trinity Church is located in a low-income community. This implied that the families surrounding Holy Trinity might not have had the means to test the lead levels in the pipes of their homes. I had written about lead, since to me, this is one of the most dangerous contaminants when it comes to consumptive injury of pregnant women and small children. However, there are other contaminants of great concern, such as arsenic, pesticides, and industrial pollutants such as tetrachloroethylene (PCE), trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-1,2-DCE).

Rutgers University offered to assist in testing the lead in the water supply at Holy Trinity in West Orange, NJ. In addition to this, Rutgers University invited me numerous times to participate in conferences about the environment. My participation in the conferences proved to be extremely valuable since I was being exposed to lectures, methodologies, and presentations by experts in the field. On April 28, 2017, I participated in a symposium organized by Dr. Norah MacKendrick, Associate Professor of Sociology at Rutgers, New Brunswick, entitled, Environmental Justice and the Future of

⁵³ Rutgers Environmental and Occupational Health Sciences Institute, <https://eohsi.rutgers.edu/> (accessed October 1, 2017).

Environmental Health Research. The keynote speaker was Dr. Linda Birnbaum, Director of the National Institute of Environmental Health Sciences (NIEHS). This kind of educational experience enriched my knowledge about environmental research that is being conducted, and reinforced my conviction as to why it is important to conduct an awareness campaign about the Water Quality in our communities.

Another development that sprang from the cooperation of Rutgers University was their invitation for some of the young people at Holy Trinity to visit the Environmental and Occupational Health Sciences Institute (EOHSI) at Rutgers, where they learned about applied sciences at an early age.

On March 21, 2017, I informed Rutgers University that the Executive Committee at Holy Trinity had approved for Rutgers University test the water at the church. A team from the Environmental and Occupational Health Sciences Institute (EOHSI) came to Holy Trinity Episcopal Church on June, 12, 2017 to collect “first draw” of water samples to be tested. On July 13, 2017, a small group of young students visited Rutgers University where they were introduced to laboratory procedures and later on the read out of the Lead (Pb) level of the water tests was provided. According to the results, the Lead level at Holy Trinity was within the acceptable EPA standard.

God, Science, and Art Summer Program

Capitalizing on the AT&T Bell Laboratories Summer Science program, in which I have been a volunteer since the 1980s, I decided to replicate and incorporate a similar educational activity at Holy Trinity Episcopal Church with the youth. Since 2014, a God and Science program has been offered every summer for four to five weeks on Saturdays, for a period of two hours each session. The idea behind the God and Science program is to motivate students to be interested in the knowledge of God by reading the first chapter

of the Book of Genesis, and to further become interested in mathematics and science in general, building on the Book of Genesis' readings.

Advanced Mathematical Concepts

Every summer we introduced advanced mathematical concepts such as Pascal's Triangle, Number Theory, and so on.⁵⁴ The reason for initiating the children and young adults to advanced mathematical concepts emanates from an experience that I had when I was a High School student at *el Instituto Técnico Industrial* (Industrial Technical Institute), ITI, in San Salvador, El Salvador. At the ITI, I learned the Pascal's Triangle and the Binomial Expansion Theorem. Using the Pascal's Triangle and the Binomial Expansion Theorem, expressions like $(a+b)$ raised to the n th power can be solved applying these concepts. These concepts were so ingrained in my mind that one time, when I was completing the Master of Science degree in Electrical Engineering (MSEE) at Polytechnic University of New York (now New York University), I solved a problem in which the term $(a+b)$ raised to the 7th power was presented in a calculation of an exam, and I was able to provide the answer in a few steps that were not prone to miscalculation if I had tried to solve the problem manually. Children and young students can learn a few of these concepts and remember them late in their academic endeavors. Note that these concepts can be applied to problems that appear in the natural sciences.

⁵⁴ Pascal's Triangle receives its name based on the French Mathematician, Blaise Pascal.

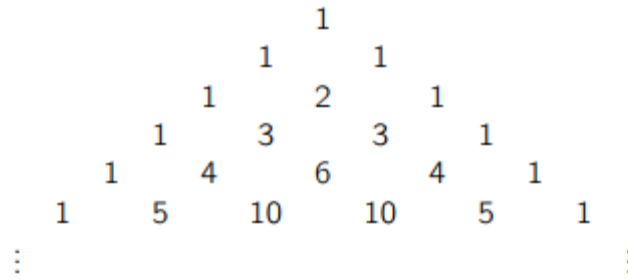


Figure 1. Pascal's Triangle⁵⁵

For 2017, we introduced the Fibonacci Sequence; this is a series of numbers that is generated by adding up the two numbers before it. The addition starts with 0 and 1, and it generates the sequence 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, and so forth.⁵⁶ The students were shown the direct connection between Fibonacci sequence and nature. Pineapples, sunflowers, and acorns were shown to the students so that they could find the spirals in them. The students were given colors so that they could track and paint the spirals for the curves to stand out. Using a large piece of paper, a Fibonacci spiral was drawn by connecting the lines in square boxes. Other examples of spiral shapes found in nature were discussed: a hurricane, a water spiral, and the shape of the galaxy.

⁵⁵ Mathcentre, "Pascal's Triangle and the Binomial Theorem," <http://www.mathcentre.ac.uk/resources/uploaded/mc-ty-pascal-2009-1.pdf> (accessed October 27, 2017).

⁵⁶ LiveScience, "What is the Fibonacci-Sequence?" <https://www.livescience.com/37470-fibonacci-sequence.html> (accessed October 4, 2017).

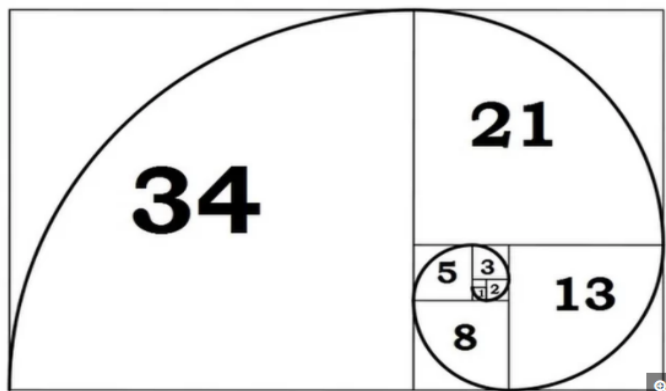


Figure 2. Fibonacci's Spiral⁵⁷

During one session of the 2017, God, Science, and Art Summer program, the conservation of the environment was discussed. I explained in simple terms the contamination problem of the drinking water. I told the students the story of Flint, Michigan, using some simple sketches of a water source that was used before the river was to provide drinking water, and the terrible outcome of lead contamination. I told the children that they need to be aware of this problem and to make sure that their parents know about what is occurring with our drinking water supply in West Orange, NJ.

The children had the opportunity to ask questions and express their opinions. One student said that ‘we should boil the water at home.’ I told the students that in the case of lead, boiling the water did not help since lead is a heavy metal and in that case the concentration of Lead in the remaining water in the container was higher due to the fact that some water had evaporated. As a possible solution, I suggested to them the use of water filters. After the presentation to the children, some of them handed in their papers on which some words and sketches were scribbled, including the drawing of water pipes and where the words “save the water” were written.

⁵⁷ Ibid.

Mentors and Role Models

Another component of the Holy Trinity God, Science, and Art Summer program is to expose the students to mentors who are professionals in their fields of expertise. We had invited engineers, accountants, business communicators, graphics artists, teachers, and musicians. It has been my experience that mentors are a positive influence in instilling in the children an interest for such areas as mathematics and science. Leroy Constantine Clarke in his Ph.D. Dissertation in Science and Technology, at the University of Toronto, Canada, offers a quotation that states: “a successful mentor guides students in a variety of ways: by helping them get the most from their educational experience, by introducing them to and making them comfortable with a specific disciplinary culture.”⁵⁸ It seemed to me that in addition to the students becoming comfortable in a specific area, they were introduced to new fields that could serve as a career path for them. In my experience, I have observed that students who are given assistance with tutoring and mentoring early on with mathematics and other subjects, become not just interested in school work, but go on to complete their education at the college level. I have known two cases in which the students who participated in the AT&T Bell Laboratories Summer Science Program completed their college education. At another level, I also motivated and mentored co-workers at Lucent Technologies, Inc., to continue their education, and three of them completed their college education while working fulltime.

⁵⁸ Leroy Constantine Clarke, “An Investigation of the Impact of Mentoring on Students’ Decisions to Pursue Professions in Medicine/Health Sciences: A Sociocultural Framework for Multicultural Science Education” (PhD diss., University of Toronto, 2010), https://tspace.library.utoronto.ca/bitstream/1807/26395/11/Clarke_Leroy_C_201011_PhD_Thesis.pdf (accessed October 4, 2017).

I have benefited personally from the mentoring of Professors Eugene Boronow (Department of Electro-Mechanical Engineering Technology) and Alberto Guzman (Department of Mathematics). Professor Guzman invited me to apply to the Resource Center for Science and Engineering at the City College of New York. The learning and mentoring opportunities offered by professors Boronow and Guzman were influential in the advancement of my educational and professional endeavors. The dedication of both professors in providing guidance and support while I was completing my undergraduate engineering education influenced me to pursue advanced education in Engineering and Science. In 1992, I graduated with a Master's Degree in Electrical Engineering from Polytechnic University of New York. Likewise, I received mentoring in the area of theology from the Rev. Dr. R. Douglas Bendall, Ph.D. There is clear evidence that tutoring and mentoring can have a positive impact on young minds in terms of inspiration, direction, tenacity, and support.

The expectation for the youngsters at Holy Trinity Episcopal Church in West Orange, NJ, is that they will be motivated, first to stay in school, and second, to consider completing their college education in the areas of mathematics and sciences, specifically in environmental sciences. Two students who had participated in the God, Science and Art Summer Program are currently expected to graduate from West Orange High School in 2018. It is my intention to track their progress to observe the impact of the summer program activities on their academic endeavors.

Questionnaires: formulation, distribution and analysis

A project team member, Ms. Natalia Navas, who is currently completing a Ph.D. in Sociology at Stony Brook University of New York, formulated a series of questions that were used to collect data on what people knew about local Water Quality. The author and another member of the project team redesigned the questionnaire, simplifying it to avoid misinterpretation of the questions. The objective was to design the questions to reduce non-responses and to minimize measurement error.⁵⁹ As can be observed from the questionnaire in the Appendix D, the questions were designed to find out if people knew the name of the company that provided the water to their town, the contaminants in the water, the problem of lead (Pb), how to access their town's water report, and the date their dwelling was built, among others.⁶⁰ The questionnaire was originally written in English, and was subsequently translated into Spanish.⁶¹ They were distributed to the audience before the sermons were delivered or before a presentation was made.

A total of 67 questionnaires were returned, 26 in Spanish and 41 in English. The sample in total is small. However, the analysis of the data will color the findings. There are people who consider “that numbers have colors”⁶² and can paint a reality. So, a small number of responses is better than none at all. Thus, it is expected that the analysis of the

⁵⁹ University of Wisconsin, Office of Quality Improvement, *Survey Fundamentals: A Guide to Designing and Implementing Surveys* (December 2010), https://oqi.Survey.wisc.edu/resourcelibrary/uploads/resources/Survey_Guide.pdf (accessed September 29, 2017).

⁶⁰ Monmouth County, New Jersey, “Assessment Records Search,” http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=monm&passwd=data&district=1301&mode=11 (accessed October 2, 2017).

⁶¹ Taking advantage of Google Translate tool proved beneficial. Not only were the translations accurate, but the format was also maintained.

⁶² Stanislas Dehaene, *The Number Sense: How the Mind Creates Mathematics* (New York: Oxford University Press, 1997), 83.

questionnaires will provide possible trends and color the issues uncovered (see tables 4 and 5). Summaries of the responses to each question in the questionnaire and conclusions are presented below.

Question 1: How far are you from Holy Trinity West Orange, NJ?

In question 1, it was established that most of the respondents were residents of West Orange, NJ, and resided not far from where Holy Trinity Episcopal Church is located. A small group of respondents was from the surrounding towns. The aim of this question was to find out if the participants lived in close proximity to Holy Trinity, and to establish a connection in the event that the testing of the Water at Holy Trinity did not meet the standards for compliance in respect of contaminants and specifically in the case of Lead (Pb). The water-testing was conducted by Aqua Pro-Tech Laboratories on May 26th, 2017, and by the Environmental Labs from Rutgers University on June 6, 2017. The results showed that the Water Quality at Holy Trinity Episcopal Church was in compliance as per the EPA requirements. In the case of Rutgers University, the water testing was done for Lead (Pb) only. Although the testing of the water was found to be within the compliance standards as indicated above, it did not mean that the test results would be the same all the time. Babu Srinivas Madabhushi, an environmental engineer, stated that “it is wiser to test for certain contamination indicators on a regular basis.”⁶³ However, there is a problem with testing the water on a regular basis since it incurs a substantial cost. Since the respondents who participated in the questionnaire cannot rely on the fact that the water testing at Holy Trinity Episcopal Church in West Orange, NJ, passed, they needed to test the Water Quality in their homes and apartment buildings.

⁶³ Babu Srinivas Madabhushi, “Should I Get My Water Tested?” *On Tap* (Fall 2000), http://www.nesc.wvu.edu/ndwc/articles/QandA/OTf00_Q_A.pdf (accessed October 11, 2017).

Question 2: How many children live in your household who are less than 6 years old?

This question was aimed at finding out about the children in the vicinity of Holy Trinity Episcopal Church in West Orange, NJ. It is known that Lead (Pb) has negative developmental effects on children under six years of age. As it has been reported, “recent studies have linked maternal lead exposure to fetal premature death, prenatal growth abnormalities, reduced gestational period, and reduced birth weight.”⁶⁴ Adding to this, it is understood historically that lead is associated with increased fetal death and infant mortality rates.⁶⁵ When I delivered the sermons and presentations, I provided information on this danger of the presence of lead in water on child development. The Spanish-language questionnaire indicated that there are eight children living with their families, and the English-language questionnaire indicated that there were two children. Families with children need to know about this health danger.

Question 3: Is there a pregnant woman living in your household?

This question was formulated in order to find out about pregnant women in the community. A small number of respondents indicated that women were living in their household. The Spanish-language questionnaire indicated that there were no pregnant women living with them, and the English-language questionnaire indicated that there was one pregnant woman in the household. Pregnant women are in clear danger when it comes to lead (Pb) in their drinking water as the fetus is even more at risk as lead

⁶⁴ Daniel S. Grossman and David J.G. Slusky, “The Effect of an Increase in Lead in the Water System on Fertility and Birth Outcomes: The Case of Flint, Michigan” (August 7, 2017), 3, <http://www2.ku.edu/~kuwpaper/2017Papers/201703.pdf> (accessed October 11, 2017).

⁶⁵ Ibid.

crosses the placental barrier since “there is no protective barrier for the fetus from exposure to lead from mother’s blood.”⁶⁶

The sermons and presentations presented information about the problems of high levels of lead in drinking water, and its negative effect on the fetuses. As indicated below,

Lead might shorten the gestational duration, which may cause preterm birth to occur via the induction of uterine contractility by calcium-mediated mechanisms and/or those independent of extracellular/intracellular calcium concentration. These two adverse outcomes can increase the risk of infant mortality, which is the most important health system quality indicator.⁶⁷

Pregnant women should be informed about the effects of lead on fetuses during gestation, and provided with water filters for their household taps. According to the EPA, the impact during pregnancy of the fetus receiving lead from the mother’s bones may affect brain development.⁶⁸ This event in itself would be detrimental for the mental development of a child, and in some cases, it could lead to the death of the infant.

Question 4: What type of residence do you live in?

It was designed to find in what kind of dwelling the respondents lived in. In the questionnaires, the Spanish-speaking respondents indicated that there were 14 families living in single-family houses, while the English-speaking respondents indicated that there were 33 families living in single-family houses. These families were told that the

⁶⁶ Robert Goyer, “Transplacental Transport of Lead,” *Environmental Health Perspectives* 89 (1990): 101-105, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1567784/pdf/envhper00422-0101.pdf> (accessed December 4, 2017).

⁶⁷ Mohsen Vigeh, “Effects of Lead and Other Metals on Pregnancy Outcomes,” *Juntendo Medical Journal* 60, no. 5 (2014): 458-460, https://www.jstage.jst.go.jp/article/jmj/60/5/60_458/_pdf (accessed October 11, 2017).

⁶⁸ United States Environmental Protection Agency, Office of Ground Water and Drinking Water, “Drinking Water: Best Management Practices for Schools and Child Care Facilities with Their Own Drinking Water Source,” http://www.in.gov/idem/files/lead_epa_schools_private.pdf (accessed December 4, 2017).

testing of the Water Quality was their responsibility. During the West Orange Town Council Meeting on July 11, 2017, Councilman, Mr. Victor Cirilo indicated that the owners of the houses and buildings were responsible for paying for the water testing on their sites.⁶⁹ During the presentations on the Water Quality, the participants were advised to have their Water Quality tested at their homes in order to find out if their water was compromised with contaminants, in particular with lead.

Question 5: Do you know in what year your house or apartment was built?

The purpose of this question was to invite participants to find out when their house or building was constructed. It is known that lead was used in indoor plumbing before 1920. For example, “in the late-nineteenth- and early-twentieth-century United States, lead was often used in the construction of water service mains.”⁷⁰ This was the reason for finding out when the houses or buildings were built. From the questionnaires, I established that five Spanish-speaking respondents indicated that they knew the date when their dwellings were built, while 25 English-speaking respondents indicated a positive response to this question. I deduced that the majority of the Spanish-speaking respondents seemed not to know about this important fact. In contrast, the English-speaking group seemed to be better informed about the construction date of their houses or buildings. I suggested to the participants to ascertain their dwelling’s date of

⁶⁹ West Orange, NJ - Town Council Meeting - July 11, 2017
<https://www.youtube.com/watch?v=tWLMUP9bO6w&t=11s> (accessed October 11, 2017).

⁷⁰ Werner Troesken and Patricia E. Beeson, “The Significance of Lead Water Mains in American Cities: Some Historical Evidence,” <http://www.pitt.edu/~troesken/papers/lead2.pdf> (accessed October 11, 2017).

construction by accessing the NJ Assessment Record webpage.⁷¹ I further informed the participants that for any dwellings constructed before 1920, the residents needed to have their water tested for Lead.

Question 6: Do you know source of your water?

This question was asked to ascertain if the participants knew the source of their drinking water in the Township of West Orange, NJ. According to the respondents' inputs, 8 (30.76%) responses were received by the Spanish-speaking group and 32 (78%) responses were provided by the English-speaking group. This indicates that the Spanish-speaking group was less knowledgeable than the English-speaking group about the source of the water supplied to the Township of West Orange. I deducted that the general public, and the Hispanic/Latino population in particular, was in need of an educational campaign about Water Quality issues. At the presentations made to the Spanish-speaking and English-speaking groups on "How to Understand the Water Report of West Orange, NJ", information of the sources of the drinking water was provided.

Question 7: What is the source of your drinking water for members of your household?

This question was formulated to find out if the participants used tap water for drinking purposes. A total of 21 responses (80.76%) from the Spanish-speaking group reveal that they use tap water for drinking purposes, while for the English-speaking group, that number is 22 (53.65%). The data indicate that the English-speaking group is more aware of issues of purity regarding the tap water, and they use bottled or filtered water for drinking. Note that, in the presentations on Water Quality, the participants were

⁷¹ "NJ Assessment Records Search," http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=monm&passwd=data&district=1301&mode=11 (accessed March 26, 2017).

advised to let the water run for two minutes before using it for cooking. Letting the water run for at least two minutes allows for most of the Lead concentration to go flushed through in the pipes, especially in the morning.

Question 8: Do you use tap water to cook?

The idea of this question was to bring awareness to the fact that boiling water could increase the lead concentration level while cooking. Twenty Spanish-speaking respondents (76.92%) indicated that they used tap water for cooking, while 38 of the English-speaking respondents (92.68%) responded affirmatively. The data indicate that a large percentage of both groups used tap water for cooking. During the presentations on the Water Quality, I repeatedly advised them to let the water run for two minutes before using it for cooking and drinking. In addition, they were warned not to use hot water from the faucet for cooking. The reason behind the warning was to educate them that Lead is a heavy metal that does not evaporate during the boiling of water; instead, boiling reduces the amount of the liquid water in the evaporation process and the Lead level could go higher.

Question 9: Are you concerned about the quality of your water?

The principal idea behind this question was to find out if the participants had a concern about the quality of their water. In the Spanish-speaking group, 19 of them (73.07%) responded that they were concerned, and 28 (68.2%) in the English-speaking group. These results show that both groups were concerned about the quality of the water in their community. The finding indicates that people are somehow aware that the Water Quality in the area might be compromised, and that they are concerned about it. In my presentations, participants were provided with facts from the Water Report as to why it is important to be concerned with Water Quality in general.

Question 10: Do you know the name of the company that supplies the water to the Township of West Orange?

This question was asked to find out what percentage of the two groups knew about the company that supplies the water to the Township of West Orange. In the Spanish group, only 4 (15.38%) of the respondents indicated that they knew the company that supplies the water to West Orange, while in the English group that number was 15 (36.58%). As can be observed, both percentages are low, and reveal that the majority of the participants did not know that the name of the company that supplies their drinking water. During the water quality presentations, participants were provided with the name of the company, NJ American Water that supplies the drinking water to West Orange, NJ.

Question 11: Do you know how to get the water report for the Township of West Orange?

The objective of this question was to determine if the participants knew how to obtain the Water Quality report for West Orange, NJ. Only, two (7.69%) of the Spanish-speaking participants answered in the affirmative, while 10 (24.39%) of the respondents in the English-speaking group answered similarly. The data show that the Hispanic/Latino group is less informed about how to obtain the Water Quality report than the English-speaking group. However, the English-speaking group also revealed a low percentage in knowledge of the investigative methods for obtaining the water report. During the Water Quality presentation, participants were instructed, step-by-step, on how to obtain the West Orange, NJ, Water Quality Report. As revealed above, educational workshops, as well as awareness campaigns should be organized, and regularly presented with instructions on how to gain access to the Water Quality report in West Orange, NJ.

Question 12: Do you know about water issues in other towns like Flint, Michigan and Newark, NJ?

This question was formulated to gauge if the participants were aware of water supply pollution in other places, such as Flint, Michigan and Newark, NJ. In the Spanish-speaking group, only six (23%) of the respondents replied in the affirmative; while in the English-speaking group, 30 (73.17%) of the respondents replied in the affirmative. The data show that the Hispanic/Latino group is less aware of water pollution in other places, while the English-speaking group showed a higher percentage of awareness. During the Water Quality presentations, the water pollution crisis in Flint, Michigan and Newark, NJ, were mentioned. To create an impact on their awareness about water pollution, the introduction of the NOVA PBS documentary, entitled *Poison Water*, was shown to the English-speaking group.⁷² For the Spanish-speaking group, a video presentation from the Universidad Autónoma de México (UNAM) entitled '*Calidad del Agua: Entrevista a la Dra. Ana Cecilia Espinosa García*' (Water Quality: Interview to Dr. Ana Cecilia Espinosa García) was made.⁷³ The reason for showing the UNAM video was because it was delivered in Spanish. As a result, participants became very interested in learning more about the Water Quality in their local community.

Question 13: Are you concerned about water contamination in your home and community?

This question was posed to ascertain if the participants were concerned about water supply contamination in their homes and communities. The Spanish-speaking

⁷² NOVA PBS, "What Exactly Went Wrong in Flint—And What Does It Mean for the Rest of the Country?" aired May 31, 2017 at 9 pm on PBS, https://www.youtube.com/watch?v=r_S8eNqBnaA (accessed October 13, 2017).

⁷³ Ana Cecilia Espinosa García, "Calidad del Agua: Entrevista a la Dra.," Red del Agua UNAM, October 4, 2016, <https://www.youtube.com/watch?v=kKkoknwZ2HY> (accessed October 13, 2017).

group had 20 (76.9%) respondents in the affirmative, while in the English-speaking group, had 37 (90.24%). Both groups seemed to be concerned about the presence of pollution in the water supply in their homes and in the community. This is a central finding, since it shows that participants and perhaps the public in general, are interested in their environment, and especially concerned about the possible pollution in their drinking water.

Question 14: How knowledgeable are you about water pollution in your community?

This question sought to find out how knowledgeable participants were about water pollution in their communities in general. Only, six (23.07%) of the Spanish-speaking respondents indicated that they had some knowledge, while in the English-speaking group, 20 of them (48.78%) answered in the affirmative. These numbers indicate that both groups lack the needed knowledge about water pollution in their communities. Hence, additional educational opportunities are required. The Water Quality project addressed this issue by making presentations and delivering sermons at Holy Trinity Episcopal Church in West Orange. In addition, when the opportunity arose, I was able to speak about water supply pollution in New Jersey and New York and via social media.

Question 15: How knowledgeable are you about heavy metals such as mercury (Hg), Cadmium (Cd), arsenic (As), Chromium (Cr), Thallium (Ti), and Lead (Pb) in your drinking water?

The objective of this question was to ascertain if the participants had some specific knowledge about some of the heavy metals present in the water. Only, five (19.23%) of the Spanish-speaking respondents answered in the affirmative, while, of English speaker respondents, 20 (48.78%) reported that they had some knowledge. As the

data show, the level of knowledge in both groups of participants was very low. This points to the fact that the general population lacks the knowledge about chemistry and the contaminants that could possibly compromise their drinking water. Education in public health could alleviate this potential problem, and increase the level of awareness about the Water Quality in the communities. To this end, through the Water Quality project in West Orange, NJ, sermons were delivered and presentations made as to How to Understand the Water Quality Report of West Orange, NJ.

Question 16: How knowledgeable are you about chemicals, pesticides, and fertilizers in your drinking water?

This question was posed to inquire about the participants' knowledge about the presence of chemicals, pesticides, and fertilizers in their drinking water. Only 6 of them (23.07%) of the Spanish speaking respondents indicated that they had some knowledge about chemicals, pesticides, and fertilizers in the water, while in the English-speaking group, 22 of the (53.65%) respondents answered in the affirmative indicating that they had some knowledge. It is clear that the Hispanic/Latino group has less knowledge about the chemicals, pesticides, and fertilizers in the drinking water than the English-speaking group. However, both groups showed a lack of knowledge about chemicals, pesticides, and fertilizers in their drinking water. This fact points to the need for public health educational opportunities to raise the awareness of water pollution in our communities. During the presentations of the Water Quality project in West Orange, NJ, special attention was given to this particular aspect. The participants were shown charts with the information about the chemicals, pesticides, and fertilizers.

Table 4. Response to Spanish Questionnaire

	Question	Response	Notes
1	How far are you from Holy Trinity West Orange, NJ?	Most respondents came from West Orange, NJ.	A few responses were from Orange, NJ. 8 people did not submit an answer.
2	How many children live in your household who are less than 6 years old?	8 children were reported by 6 respondents.	23.0% of respondents.
3	Is there a pregnant woman living in your household?	0 pregnant women	0% of pregnant women live in household.
4	What type of residence do you live in?	14 responded to live in a single-family house.	53.84% live in a single-family house.
5	Do you know in what year your house or apartment was built?	5 responded positive to this question.	19.23% responded to know when their dwelling place was built.
6	Do you know source of your water?	8 responses were received.	30.76% of the responders indicated that they knew the source of their water.
7	What is the source of your drinking water for members of your household?	21 respondents indicated public drinking water.	80.76% consume public drinking water.
8	Do you use top water to cook?	20 answered that they use tap water to cook.	76.92% used tap water for cooking.
9	Are you concerned about the quality of your water?	19 responded that they are concerned.	73.07% responded that they are concerned about the quality of their water.
10	Do you know the name of the company that supplies the water to the Township of West Orange?	Only 4 responded that they knew the company that supplies the water to West Orange.	15.38% of the respondents know the name of the company that supplies the water to West Orange.
11	Do you know how to get the water report for the Township of West Orange?	Only 2 answered in the positive.	7.69% responded that they knew how to get the water report for the Township of West Orange.
12	Do you know about water issues in other towns like Flint, Michigan and Newark, NJ?	Only 6 responded in the positive.	23% knew about water issues in other towns like Flint, Michigan and Newark, NJ.

13	Are you concerned about water contamination in your home and community?	20 responded that they are concerned.	76.9% are you concerned about water contamination.
14	How knowledgeable are you about water pollution in your community?	Only 6 responded in the positive.	23.07% are knowledgeable about water pollution.
15	How knowledgeable are you about heavy metals such as mercury (Hg), Cadmium (Cd), arsenic (As), Chromium (Cr), Thallium (Ti), and Lead (Pb) in your drinking water?	Only 5 responded in the positive.	19.23% are knowledgeable about heavy metals in the water.
16	How knowledgeable are you about chemicals, pesticides, and fertilizers in your drinking water?	Only 6 responded in the positive.	23.07% are knowledgeable about chemicals, pesticides, and fertilizers in the water.

Table 5. Response to English Questionnaire

	Question	Response	Notes
1	How far are you from Holy Trinity West Orange, NJ?	Most respondents came from West Orange, NJ.	A few responses were from Orange, NJ. 2 people did not submit an answer.
2	How many children live in your household who are less than 6 years old?	2 children were reported by 2 respondents.	4.87 % of respondents.
3	Is there a pregnant woman living in your household?	1 pregnant woman was reported.	2.43% of pregnant women live in household.
4	What type of residence do you live in?	33 responded to live in a single-family house.	80.4% live in a single-family house.
5	Do you know in what year your house or apartment was built?	25 responded positive to this question.	60.9% responded to know when their dwelling place was built.
6	Do you know source of your water?	32 responses were received.	78% of the responders indicated that they knew the source of their water.
7	What is the source of your drinking water for members of your household?	22 respondents indicated public drinking water.	53.65% consume public drinking water.
8	Do you use tap water to cook?	38 answered that they use tap water to cook.	92.68% used tap water for cooking.
9	Are you concerned about the quality of your water?	28 responded that they are concerned.	68,2% responded that they are concerned about the quality of their water.
10	Do you know the name of the company that supplies the water to the Township of West Orange?	15 responded that they knew the company that supplies the water to West Orange.	36.58% of the respondents know the name of the company that supplies the water to West Orange.

11	Do you know how to get the water report for the Township of West Orange?	10 answered in the positive.	24.39% responded that they knew how to get the water report for the Township of West Orange.
12	Do you know about water issues in other towns like Flint, Michigan and Newark, NJ?	30 responded in the positive.	73.17% knew about water issues in other towns like Flint, Michigan and Newark, NJ.
13	Are you concerned about water contamination in your home and community?	37 responded that they are concerned.	90.24% are you concerned about water contamination.
14	How knowledgeable are you about water pollution in your community?	21 responded in the positive.	51.21% are knowledgeable about water pollution.
15	How knowledgeable are you about heavy metals such as mercury (Hg), Cadmium (Cd), arsenic (As), Chromium (Cr), Thallium (Ti), and Lead (Pb) in your drinking water?	20 responded in the positive.	48.78% are knowledgeable about heavy metals in the water.
16	How knowledgeable are you about chemicals, pesticides, and fertilizers in your drinking water?	22 responded in the positive.	53.65% are knowledgeable about chemicals, pesticides, and fertilizers in the water.

Advertisement of Events

In order to inform the public about the Water Quality Project in West Orange, NJ, various types of media were used. The vehicles used included YouTube, web posts, Facebook, email, a community radio, and paper flyers (See Appendix E).

Early in the process, prior to the launching of the project, a relationship was established with a community radio station named Uvestacion.⁷⁴ A telephone interview in Spanish was conducted on February 21, 2017, which Uvestacion later posted on their

⁷⁴ <https://www.uvestacion.com/> (accessed October 2, 2017).

YouTube account.⁷⁵ During the interview, I spoke about the purpose of the project in which I stated that the idea was to disseminate information about water contamination in the communities. This was the first time that the public was informed about the Water Quality project in West Orange, NJ. Uvestacion also participated during the presentation, on 4 June, 2017, to the Spanish-speaking congregation at Holy Trinity Episcopal Church in West Orange, NJ, in which the public was instructed on how to read and understand the Water Quality report. Uvestacion also interviewed me after the presentation, and later posted a video of the interview on YouTube.⁷⁶ Uvestacion has become a partner in informing the public about the potential dangers of water contamination. For example, on their webpage there was information displayed in Spanish indicating that on 1 September, 2017, Newark Mayor Ras J. Baraka, and Mrs. Andrea, Hall Director of the Department of Water and Sewer Utilities, reported that there are houses and buildings in the city where high levels of lead had been uncovered.⁷⁷ Following this lead, I later found a letter dated 13 September, 2017, and signed by a group of community organizations under the name Newark Drinking Water Coalition, that was sent to the Newark Mayor's Office, outlining a number of demands for mitigating the pollution in the water supply.⁷⁸ The letter mentioned that "what the City's statement fails to mention is this: Newark's lead levels are now among the highest recorded by a large water system in America in recent years.

⁷⁵ https://www.youtube.com/watch?v=srShm_tzrzMon (accessed September 29, 2017).

⁷⁶ "Calidad Del Agua En West Orange NJ," <https://www.youtube.com/watch?v=N1apL0ex6LQ> (accessed October 2, 2017).

⁷⁷ Information about the community radio Uvestacion can be found at <https://www.uvestacion.com/>. Please note that the information at Uvestacion changes from time to time.

⁷⁸ Letter to Mayor Baraka and Director Hall Adebawale, "Re: Elevated Lead Levels in Newark's Drinking Water," September 13, 2017, https://www.nrdc.org/sites/default/files/newark-drinking-water-coalition-letter_2017-09-20.pdf (accessed October 2, 2017).

In its most recently reported monitoring period, Newark’s lead levels tripled as compared to previous measurements – rising to 27 parts per billion at the 90th percentile, meaning at least 10 percent of the addresses tested had 27 parts per billion or more of lead in their water.”⁷⁹ The Newark Drinking Water Coalition asked the Mayor’s Office to “specifically, please explain the City’s detailed plans to:

- a. Conduct mandatory public education;
- b. Conduct source water monitoring and Water Quality parameter monitoring;
- c. Commence replacing lead service lines; and
- d. Meet the required deadlines for providing NJDEP with a list of Newark’s lead service lines, proposed lead service line replacement schedule, revised lead sampling plan, source water treatment recommendation, and optimal corrosion control treatment plan.”⁸⁰ As can be observed, establishing a relationship with community organizations and publishing documents on the internet can be an effective way to reach the public.

Facebook was another tool used to reach the public for the activities and events that were taking place in West Orange, NJ. Invitation flyers, videos and updates on the project’s progress were regularly posted.

Web blogs were also used to publish sermons and other materials on the web. Web pages from various groups posted information on the Water project in West Orange. Some of the groups that advertised announcements and posted videos on their sites are: GreenFaith, the Episcopal Diocese of Newark, Uvestacion, Rutgers Environmental and

⁷⁹ Ibid.

⁸⁰ Ibid.

Occupational Health Sciences Institute (EOHSI), the West Orange City Council, the Township of West Orange, the West Orange Hispanic Foundation, and the Latino Conservation Week. The author published some of the work on YouTube and Scribd, (<https://www.scribd.com>), a free server where documents can be posted on the web) using free-of-charge accounts. As at 2 October, 2017, the number of views for all postings made is as follows:

Table 6. Number of Views on YouTube and Scribd

Posting	Date	Number of Views
YouTube:		
https://www.YouTube.com/watch?v=VscYb5PQj-4 (Water Quality presentation)	June 4, 2017	26
https://www.YouTube.com/watch?v=E9040Eid9wQ (English Sermon on Water)	June 11, 2017	43
https://www.YouTube.com/watch?v=z6Xr9fxC-yU (Spanish Sermon on Water)	June 12, 2017	20
https://www.YouTube.com/watch?v=nfzMdtgmQ5Y (Spanish advertisement for God, Science, and Art Summer Program).	June 15, 2017	31
https://www.YouTube.com/watch?v=ZcdzdujFs8U (Advertisement for the God, Science, and Art Summer Program)	June 15, 2017	45
https://www.YouTube.com/watch?v=S4CFmkaG5Mw (God, Science, and Art Summer Program)	August 7, 2017	96
Scribd:		
https://www.scribd.com/document/342402409/Water-is-Life-A-Sermon-About-Water-Quality-in-West-Orange-NJ (Sermon about Water Quality in West Orange, NJ)	March 19, 2017	47
https://www.scribd.com/document/342406981/El-Agua-Es-Vida-Un-sermon-sobre-la-calidad-del-agua-en-West-Orange-NJ (Sermón acerca de la Calidad del Agua en West Orange, NJ)	March 19, 2017	17

It is possible to increase the number of viewers by paying for the web servers such as YouTube and Facebook. However, it should be noted that Facebook views were not tracked since it is very difficult to cite the posting. Even though paper flyers were distributed in the community, it appears that the most effective way to attract the public to the events was via electronic media.

Video Production for the Water Quality Project

For anyone attempting to reach the public via multimedia platforms, it is necessary to learn how to develop electronic media. As the God and Science project was planned, it was decided that some posting would be made on YouTube, Facebook, and other webpages.

Initially, a videographer was hired to shoot and prepare a pair of videos. However, as more events were scheduled and advertisement was required at short notice, the author decided to learn how to develop videos, using the embedded program on the Apple computer, iMovies, to develop good quality videos. It took some trial and error to become proficient using iMovies.⁸¹ The author was thus able to complete videos for the project in a reasonable amount of time and to post them on YouTube and Facebook.

Additional experimentation was done to improve the quality of the videos. For example, a High Definition (HD) Pro Webcam C920, at a reasonable cost of under \$80.00, was incorporated to produce the videos. To improve the sound, an Audio-Technica ATR2500-USB Cardioid Condenser USB Microphone was added, at a cost of under \$100.00. The money spent on these devices to produce high-quality video documentary footage was worth it.

⁸¹ It proved useful for me to have experience as an engineer to learn how to develop the videos using the iMovies for the Apple MacBook Pro computer.

In order to incorporate audio messages in the videos, various methods of voice recording were tested. The iPhone was used to record audio independently, and then saved as an audio message and later edited into the iMovie video. In an effort to become more efficient in the development of audio recordings, the GarageBand software application for MacOS was applied. The GarageBand software allows users to create, mix, master, and share music or other audio content.

The most time-consuming activity in producing a finished video was the editing process. From the time that I started learning the iMovies program on the Apple computer to the point that I could complete a video with embedded text, background music, and introduce various images, I estimate that it took approximately six months. However, this was time well spent since the experience gained in the process can be applied in other areas of ministry. Currently, I am creating videos from Holy Trinity Episcopal Church and posting them on YouTube and Facebook. The benefit of this experience is that it can be expanded and transferred to other ministries.

CHAPTER 4

THE INFLUENCE OF WATER IN THE CREATION OF SOCIETIES

Historical influence of water in the creation of communities

What is the influence of water in the life of communities?

Historically, it is assumed that humans appeared on the earth about 100,000 years ago. Evidence shows that for a long time, humans survived as hunters and gatherers finding food in a nomadic existence. After the last Ice Age, around 10, 000 years ago, there was a change. That is “people began to settle down in one place, and to evolve more complex social structures. Civilization as we know it was beginning.”⁸² One of the strongest convincing arguments for the settlement in communities was the “domestication of plants, sometimes called the agricultural revolution, as the single most important event in human history.”⁸³ In addition, the invention of tools like the “plow let to the domestication of animals for agricultural use, and the improvement of the plow over the hoe meant that the cultivation of the soil could finally yield an economic surplus that was large enough to encourage cultivators to settle in villages.”⁸⁴ Hence, with agriculture as a means to produce staples or food, water became a necessity for survival.

⁸² John J. Macionis and Vincent N. Parrillo, *Cities and Urban Life*, 3rd ed. (Upper Saddle River, NJ: Pearson Education, 2004), 28.

⁸³ Ibid.

⁸⁴ William R. Herzog, *Parables as Subversive Speech: Jesus as Pedagogue of the Oppressed* (Louisville, KY: Westminster/John Knox Press, 1994), 56.

The Indus, the Nile, the Tigris and Euphrates, and the Yellow Rivers

It is evident that water, over the history of humanity, has played an important role in sustaining life and civilizations. Communities were formed along rivers and lakes and near the sea. There is a consensus estimate that “between 3000 and 2000 B.C.E. ... civilizations formed independently of each other along the Indus, the Nile, the Tigris and Euphrates, and the Yellow Rivers.”⁸⁵

Since the development of agriculture, water use for crop irrigation has become an important process in many societies around the world. There is evidence that as civilizations settled down to farm the land, they developed irrigation systems centuries ago. Other parts of the world such as “the great civilizations of Mesoamerica, however, depended on harvesting surface runoff, small rivers, lakes and groundwater” for crops.⁸⁶

As people used water, there was a need to channel it, store it, and most importantly to keep it clean. Some indication of this care for water is found in India where people were using charcoal for filtering water and storing the water in metal pots. For example, “the use of brass container to store the water was already a common practice in ancient Indian civili[z]ation. By 2000 B.C., the people of India were filtering water through charcoal and preserving it in copper pots.”⁸⁷ The ancient Egyptians and

⁸⁵ A. S. Jadhav, “Advancement in Drinking Water Treatments from Ancient Times,” *International Journal of Science, Environment and Technology* 3, no. 4 (2014): 1415-1418, <http://www.ijset.net/journal/374.pdf> (accessed July 4, 2017).

⁸⁶ UNESCO, “Water History.”

⁸⁷ Ibid.

Sumerians were using carbon in the form of wood chars (charcoal) by 3750 BC.

However, it is not known if the charcoal was used for filtering water.⁸⁸

It is believed that “In China, rice growing and planting was practi[z]ed in the southern part of the Yangtze River Basin and dates back 6,000 years.”⁸⁹ As ancient paddy fields were discovered in Jiangshu as well as in Hunan provinces, one can infer that those paddy fields were associated with irrigation canals, ditches, wells and ponds to grow rice.⁹⁰

Pakistan

There is important archeological evidence that points to the fact that from the early Bronze Age,⁹¹ the city of Mohenjo-Daro, located in modern Pakistan, water was used in wells, water pipes, and toilets.⁹² This indicates that water was not only used for agriculture, but for other uses such as disposing of human feces. As water was harnessed for other public uses, the spread of diseases most likely increased in those communities.

Since the Bronze Age, fountains are known to have existed in southeastern Greece and the Indus Valley. The fountains were originally connected to springs or aqueducts to provide drinking water, water for bathing, and water for washing to the residents of palaces, cities, towns and villages.

⁸⁸ Ferhan Cecen, *Water and Wastewater Treatment: Historical Perspective of Activated Carbon Adsorption and its Integration with Biological Processes* (Weinheim, Germany: Wiley-VCH, 2012), https://application.wiley-vch.de/books/sample/3527324712_c01.pdf (accessed July 4, 2017).

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ The early Bronze Age covers the following dates: 3300 BCE-2000 BCE.

⁹² H.S. Vuorinen, P.S. Juuti, and T.S. Katko, “History of Water and Health from Ancient Civilizations to Modern Times,” *Water Science and Technology: Water Supply* 7, no. 1 (2007): 49-57, <http://www.manantialednubes.org/wp-content/uploads/2014/01/SA.0101-VuorinenEtal2007-HistoryWaterHealth.pdf> (accessed July 4, 2017).

By the time of the Roman Empire, the vast territory covered by an immense area extended from Spain, and Gaul, to Mesopotamia. In the first century, this territory contained about 50 million people. Jesus lived in such world in Palestine. José A. Pagola, a Spanish Theologian, asserts that “The population was mostly concentrated in large cities, mostly along the shore of the Mediterranean, large rivers, or the protected areas of the most fertile plains.”⁹³

Palestine

In first century Palestine “Along the coast, Herod constructed an aqueduct 40 miles long. It brought water to a new seaport he has built in honor of the Roman Emperor Caesar. Herod named the city Caesarea.”⁹⁴ In the Roman cities water played an important role for people of every social status. For example, “Every day, Romans would finish work around the middle of the afternoon and make their way to the baths. Men of all social classes mixed freely together. Old, young, rich and poor would share the daily ritual of the baths.”⁹⁵ It appears that water at that time, was managed and controlled to the point that it was not only used to satisfy people’s needs for producing food and to quench their thirst, but also for recreation.

North America

In North America, the indigenous villages are found “along rivers and fresh water drainages. Clean and cool water is a critical resource, important to the livelihood and

⁹³ José Antonio Pagola, *Jesus, an Historical Approximation* (Miami: Convivium Press, 2009), 32.

⁹⁴ Frontline, *From Jesus to Christ: The First Christians* (Part 1), <https://www.youtube.com/watch?v=gD2guEX9Jpg> (accessed December 23, 2017).

⁹⁵ PBS, “The Roman Empire: Baths,” <http://www.pbs.org/empires/romans/empire/baths.html> (accessed December 23, 2017).

cultural survival of many Native peoples.”⁹⁶ In the Cherokee society, it was conceived that “that the air, water and land could not be bought, sold or traded. They were to live with these things and not control or change them.”⁹⁷ For these indigenous people, nature was a source of knowledge, revered, and the creator of things; this is an aforementioned spiritual dimension. On the other hand, the Pueblo peoples in southwestern Colorado started producing pottery by A.D. 500. The pottery “was used for cooking, carrying and storing water, and a wide variety of other purposes.”⁹⁸

The Maya Civilization

The story of water for the Mayas is quite different: “The ancient Maya flourished in the difficult landscapes of Central America starting from 1000 B.C. until the Terminal Classic in the 10th century A.D.”⁹⁹ They had abundant fertile soils, but lacked access to lakes or rivers. Therefore, “The Maya began migrating to the interior of the Yucatán Peninsula, especially the Petén in northern Guatemala, from riverine and coastal areas by ca. 1,000 B.C.”¹⁰⁰ The Mayas developed techniques to compensate for the lack of permanent water sources, by constructing water systems, including wetland reclamation

⁹⁶ Michael E Marchand, “The River of Life: Sustainable Practices of Native Americans and Indigenous Peoples,” (PhD diss, University of Washington, 2013), https://digital.lib.washington.edu/researchworks/bitstream/handle/1773/23692/Marchand_washington_0250E_11974.pdf (accessed August 22, 2017).

⁹⁷ “Cherokee Society,” <https://www.reinhardt.edu/funkheritage/pdf/SocietyandNature.pdf> (accessed December 23, 2017).

⁹⁸ T. Kristin A. Kuckelman, “Ancestral Pueblo Indians of Southwestern Colorado,” http://www.historycolorado.org/sites/default/files/files/Educators/mesa_verde_primary_resource_set.pdf (accessed August 22, 2017).

⁹⁹ Ezgi Akpinar Ferrand, and Vernon L. Scarborough, “Ancient Maya Solutions to Water and Food Insecurity: Low Technology Lessons for Contemporary Development,” http://www.jwac.org/forum2015_Scarborough2.pdf (accessed July 4, 2017).

¹⁰⁰ Ibid.

and “passive” or concave macro-watershed systems where the Maya used gravity to divert and store water.¹⁰¹

Tenochtitlan, Mexico

In other parts of Mexico such as the area of Tenochtitlan,¹⁰² society was organized in such a way that a “village founded in the center of the lake, [Texcoco], grew into a great metropolis. That growth was marked by two incidents: the extreme famine of A.D. 1451–54 that eliminated much of the city’s population and the flood at the end of the fifteenth century brought about by the opening of the Acuecuexco spring.”¹⁰³ There is evidence that these springs were used since the late Aztec period. Numerous chroniclers report the effort to transport the water of Coyoacan to Tenochtitlan by means of aqueducts.¹⁰⁴ As in other parts of the world, the effective control and management of water systems were necessary to fulfill people’s existential needs. In Tenochtitlan, canals were designed to harness the flow of water, as well as used as a means of transportation. This may have been an opportunity to reorganize a city that had grown spontaneously. It is believed that “at the time Cortés arrived, Mexico was a city of 60,000 houses.”¹⁰⁵

Cuscatlán, El Salvador

In the case of Cuscatlán, presently known as El Salvador, and located in Mesoamerica (Central America), the Pipil were a small group of people who survived

¹⁰¹ Ibid.

¹⁰² The City of Tenochtitlan was founded circa 1345 CE, and it was destroyed circa 1521 CE by the Spaniards led by Hernán Cortés.

¹⁰³ José Luis de Rojas, “The Construction of a Metropolis,” <https://muse.jhu.edu/chapter/676627> (July 4, 2017).

¹⁰⁴ Aportaciones etnohistóricas para el estudio del Sistema Hidráulico Acuecuexco de Coyoacan. Siglos XVI-XX.

¹⁰⁵ Ibid.

basically as gatherers and hunters, before agriculture was developed.¹⁰⁶ There is an indication that “It was not until about 2000 BC that sedentary agriculture spread through the region increasing the influence of humans on vegetation.”¹⁰⁷ El Salvador had a good number of rivers and lakes that could allow for settlement, cultivation, and for agriculture to flourish. However, by the time of the Spanish conquest in the 1500s, the population was principally “concentrated mostly along the central slopes and fertile volcanic valleys of the country, and away from the central Lempa basin and the northern slopes.”¹⁰⁸ According to the Geologist Walter Hernandez, the length of the Lempa River is 422 Km of which 360.2 Km runs inside the Salvadoran territory.¹⁰⁹

The Inca Empire

Before the Inca Empire was fully developed, small herds of nomads moved from place to place. It is believed that “the first villages appeared on the seacoast between 5700 and 3000 BC.”¹¹⁰ As people began to organize into communities in coastal and highland areas, circa 2500 BC, “people developed irrigation systems to increase agricultural yields. People living in the coastal desert regions built elaborate irrigation systems to harness the many rivers that flowed from the mountains to the sea.”¹¹¹ The

¹⁰⁶ The Pipil were the dominant group from 800 AD to the 1500s AC in Cuzcatlan.

¹⁰⁷ Hector Castaneda, “Analysis of The Spatial Dynamics and Drivers of Forest Cover Change in The Lempa River Basin of El Salvador” (PhD diss, University of Florida, 2009), http://etd.fcla.edu/UF/UFE0024235/castaneda_h.pdf (accessed December 23, 2017.)

¹⁰⁸ Ibid.

¹⁰⁹ The details of the Lempa River was translated by the author from the Spanish text found at <http://www.snet.gob.sv/Geologia/NacimientoEvolucionRLempa.pdf> (accessed January 3, 2018.)

¹¹⁰ Carol P. Merriman, “Machu Picchu: Unveiling the Mystery of the Incas,” <http://peabody.yale.edu/sites/default/files/documents/education/MP%20Social%20Studies%20curriculum.pdf> (August 21, 2017).

¹¹¹ Ibid.

Incas expanded the irrigation system to make crop yields more productive. Terraces, or large retaining walls, were built in the highlands to prevent soil erosion and to control rainfall runoff. Channels were used to divert “spring water and streams to water the tiny fields. Farmers had been terracing the slopes of the Andes for centuries, and the Incas greatly expanded the amount of arable land by building terraces in conquered lands throughout the Andes.”¹¹² The United Nations Educational, Scientific and Cultural Organization (UNESCO) describes Machu Picchu as a peak of “2,430 m above sea-level, in the middle of a tropical mountain forest, in an extraordinarily beautiful setting. It was probably the most amazing urban creation of the Inca Empire at its height; its giant walls, terraces and ramps seem as if they have been cut naturally in the continuous rock escarpments.”¹¹³ Presently, some of the terraces can still be seen at Machu Picchu in Peru.

Thinking of Water as a primary element

Thales of Miletus (c. 620 BCE – c. 546 BCE), a pre-Socratic Greek philosopher, had an affinity for water. He believed that “water itself was the first principle from which all others things had sprung, and that the world itself floats on water.”¹¹⁴ Our modern understanding of the origins of the all things, the Big Bang theory, differs from Thales. However, it could be speculated that after the Big Bang occurred, water played an important role in the development of other things. Thus, Thales’s estimation on the significant role of water in the development of all other things is possible.

¹¹² Ibid.

¹¹³ UNESCO, “Historic Sanctuary of Machu Picchu,” <http://whc.unesco.org/en/list/274> (accessed August 21, 2017).

¹¹⁴ Kitty Ferguson, *Pythagoras: His Lives and the Legacy of a Rational Universe* (London: Icon, 2011), 16.

Paul Davis, Professor of Mathematical Physics at the University of Adelaide in Australia, asserts that in 1913, the distinguished Harvard biochemist Lawrence Henderson wrote:

The properties of matter and the course of cosmic evolution seen to be intimately related to the structure of the living being and to its activities; ... the biologist may now rightly regard the Universe in its very essence biocentric.¹¹⁵

The term biocentric connotes that all forms of life have intrinsic value or that everything is centered in life.

Henderson also made convincing connections “on the regulation of acidity and alkalinity in living organisms, and the way that such regulation depends crucially upon the rather special properties of certain chemicals substances.”¹¹⁶ From this work, Henderson was “greatly impressed at how water, which has a number of anomalous properties, is incorporated into life at a basic level.”¹¹⁷ The water molecule is one of the most adaptable that exists in nature.

Water is still under study since there are some anomalous physical and chemical properties that are not yet well understood. For example, “water is a small solvent, occupying about 0.03 [cubit nano meter] per molecule in the liquid state at room temperature and pressure, yet it is highly cohesive because of the strong intermolecular interactions (hydrogen bonds, or H-bonds) between the oxygen and hydrogen atoms.”¹¹⁸

¹¹⁵ P. C. W. Davies, *The Mind of God: The Scientific Basis for a Rational World* (New York: Simon & Schuster, 1992), 198.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ Kim A Sharp, “Water: Structure and Properties,” http://crystal.med.upenn.edu/sharp-lab-pdfs/sharp_EncLifeSci.pdf (accessed October 27, 2017).

As a result of these properties, water has a high boiling point, and large amounts of heat are needed to vaporize it. Note that “the strong cohesive interactions in water also result in: (1) a high viscosity, since for a liquid to flow interactions between neighboring molecules must constantly be broken; and (2) a high specific heat capacity – the ability to store a large amount of potential energy for a given increment in kinetic energy (temperature).”¹¹⁹ The water molecule is very peculiar. For example, “water, owing to its high boiling point, exists predominantly in its liquid form in the range of environments where life flourishes, although the other two phases, ice and vapor, play an essential role in shaping the environment.”¹²⁰ Thus, water is important for life to endure and flourish.

In the previous sections of this chapter, it was discussed that water is crucial for sustaining all living beings. In fact, water has been vital in the formation of organism at the low level, as well as the creation of stable communities around the world. Groups of nomads were able to bring about the agricultural revolution that allowed people to stay in one place to harvest crops for food. Presently, with population growth reaching about 7 billion around the world, water is becoming even more critical to sustaining life, as the demand for pure water to produce food, and other goods is expanding at an alarming pace. Water is vital for all living creatures, and its use must be observed with care since we all depend on it.

¹¹⁹ Ibid.

¹²⁰ Ibid.

CHAPTER 5 BIBLICAL AND THEOLOGICAL UNDERSTANDING OF WATER

Biblical and Theological Interpretation

What is the comparison of the water passage in Exodus 17: 1-5 and the living water passage in John 4:7 -14 that can move us into a creation theology?

Water is an element that permeates the Biblical narrative. The opening statement of Genesis speaks about the formation of the earth in which water is mentioned. This is known as the Creation Story. The New Revised Standard Version (NRSV) of the Bible presents it like this: “In the beginning when God created the heavens and the earth, the earth was a formless void and darkness covered the face of the deep, while a wind from God swept over the face of the waters” (Genesis 1: 1-3). Since water is necessary to sustain life as we know it, an examination of two portions of the Bible, *Exodus 17: 1-5* and *John 4:7 -14*, are proposed for the exegeses in which the two texts will be compared to explore the conceptual framework of a creation theology that support the life of all living creatures.

Exegesis of Exodus 17: 1-5

Below is the pericope for the *Exodus 17: 1-5* text:

From the wilderness of Sin the whole congregation of the Israelites journeyed by stages, as the LORD commanded. They camped at Rephidim, but there was no water for the people to drink. The people quarreled with Moses, and said, “Give us water to drink.” Moses said to them, “Why do you quarrel with me? Why do you test the LORD?” But the

people thirsted there for water; and the people complained against Moses and said, “Why did you bring us out of Egypt, to kill us and our children and livestock with thirst?” So, Moses cried out to the LORD, “What shall I do with this people? They are almost ready to stone me.” The LORD said to Moses, “Go on ahead of the people, and take some of the elders of Israel with you; take in your hand the staff with which you struck the Nile, and go.

This stage of the story puts Moses and the people at the encampment at Rephidim.¹²¹ This place has been described as part of the desert that belonged to the Amalekites.¹²²

As stated in the text above, the people have made it to this point and there was no water to drink and the surrounding area was inhospitable. Confusion and emotions of fear possibly consumed the people to the point where they confronted Moses: “Give us water to drink.” What can a leader do in these circumstances? The text reveals to us that Moses defended himself as best he could, saying: “Why do you quarrel with me? Moses attempted to bring some calm, and perhaps some sense into the people when he replied: “Why do you test the LORD?” The people had trusted the leadership of Moses as they left Egypt, but at this point, they doubted him since they did not see a way out from the predicament in which they were in – there was no water to drink. People knew then that water was needed to sustain life. They recognized that without water, they would perish.

The accusation of being brought out of Egypt to die of thirst was in their minds as they confronted Moses when they said: “Why did you bring us out of Egypt, to kill us

¹²¹ Rephidim is described as an arid and waterless place.

¹²² A. H. Sayce, *The Early History of the Hebrews* (New York: McMillan, 1897), http://rbedrosian.com/Sayce/Sayce_1897_Hebrews_Early_History.pdf (accessed August 24, 2017).

and our children and livestock with thirst?” Anyone with a dry mouth would know that water is vital, and they had access to abundant water in Egypt.¹²³

Jules Gleicher in his contribution to *Interpretation – A Journal of Political Philosophy*, entitled *Moses Dikastes*, states that:

The previous generation of Israelites had seen the plagues of Egypt, the miracle at the Sea of Reeds, and the epiphany at Mount Sinai, and still they strayed. Apparently, seeing is not believing (though perhaps the converse is true). Still, this explanation nicely captures the anguish of the man of faith who is a teacher in an age of general or growing skepticism.¹²⁴

This interpretation puts Moses as the mediator who has to deal with people of little or no belief. The people had seen the “miracles” and still they doubted. Another possible interpretation is that Moses, who was an ‘insider’ with God could be put in the position where he had to intervene in favor of the people in order to get some water.

Rashi (1040 -1105), the outstanding Biblical commentator of the Middle Ages, provides another point of view in his commentaries.¹²⁵ For instance, when Moses replied to the people: Why do you test the Lord? Rashi makes the comment, “Can He give water in an arid land?”¹²⁶ Responding to an answer with another answer is a rhetorical tool used by Moses. God had brought the people out of slavery in Egypt, and had provided for them many times. Rashi’s commentary is basically a question asking people to remember

¹²³ The reference to Egypt is expressed at various points point to the fact that they Israelites were safe from hunger even though they had been slaves. Moses appears as the unwelcome liberator.

¹²⁴ Jules Gleicher, “Moses *Dikastes*,” *Interpretation* 30, no. 2 (Spring 2003): 144, 119-157, http://www.interpretationjournal.com/backissues/Vol_30-2.pdf (accessed August 24, 2017).

¹²⁵ Jewish Virtual Library, “Rabbi Shlomo Yitzchaki (Rashi),” <http://www.jewishvirtuallibrary.org/rabbi-shlomo-yitzchaki-rashi> (accessed August 24, 2017).

¹²⁶ Rashi, “Commentary on Shemot - Exodus - Chapter 17,” http://www.chabad.org/library/bible_cdo/aid/9878/jewish/Chapter-17.htm#lt=both&showrashi=true, (accessed August 24, 2017).

the deeds that God had done for them. Why do they doubt after seeing God's works? It is the question that the people needed to answer for themselves.

It is noteworthy that in the complaint about the lack of water, not only the adults and children are mentioned, but the livestock is also brought into consideration. The inclusion of animals might sound a little altruistic for that time, but the reality was that animals provided for the wellbeing of the group. However, just the idea that the people were concerned about the animals indicates that the people were not selfish in asking for water for all. That appears like the right thing to do. In modern times, animal rights are being demanded in advanced societies.¹²⁷

It seems that "Schopenhauer stands as one of the first Western philosophers to accord not only moral standing but moral rights to animals."¹²⁸ Animal rights is an area that is currently being debated and considered as we become more conscious beings. In recent times, Peter Singer, Professor of Ethics at Princeton University, has advocated in favor of animal rights. Prof. Singer supports Jeremy Bentham's argument that animals may acquire the rights that were withheld from them. One of the principal premises made by Jeremy Bentham is that animals have the capacity to suffer, implying that they also thirst for justice even though they cannot verbalize it as humans can. Using this premise, Peter Singer explains his supporting position, in the case of animals, stating that "Bentham points to the capacity for suffering as the vital characteristic that gives a being

¹²⁷ There is a long history in the struggle for human rights, the rights for women, the rights of children, the rights of animals, and we are at the point where the rights of the Earth are also being called for. The novelist Leo Tolstoy in his novel, *Anna Karenina*, writes about the rights of women. This is a way to bring the concept of human rights into the awareness of the general public who reads literature. The United Nations wrote the Declarations of Humans Rights as the highest ideal for humanity.

¹²⁸ Stephen Puryear "Schopenhauer on the Rights of Animals," pre-print draft of paper forthcoming in *European Journal of Philosophy*, <http://www4.ncsu.edu/~smpuryea/papers/SchopenhauerRightsAnimals.pdf> (accessed August 24, 2017).

the right to equal consideration.”¹²⁹ Singer goes on to conclude that “there are no good reasons, scientific or philosophical, for denying that animals feel pain.”¹³⁰ Therefore, animals should enjoy the right to not be subjected to pain. This type of advocacy for animal rights and its acceptance would be a leap in human consciousness since it implies avoidance of consumption of animals in the human diet. Theologically speaking, we could relate to what Isaiah wrote about animals and humans living in harmony.

The wolf shall live with the lamb,
the leopard shall lie down with the kid,
the calf and the lion and the fatling together,
and a little child shall lead them.
The cow and the bear shall graze,
their young shall lie down together;
and the lion shall eat straw like the ox. (Isaiah 11: 6-7).

As we approach the future, there is one more conflict that needs to be recognized: the spiritual stewardship of the Earth. The expectation is that the Earth is a living organism that needs to be cared for and respected (See Chapter 8 for an analysis of this subject).

Returning to the Exodus text, when Moses cried out to the LORD, “What shall I do with this people? They are almost ready to stone me,” we know that Moses, as a reluctant messenger, came before God with extreme reticence. This is the case in which a leader is forced to appear before God so that the needs of the people could be met. He was concerned that if the people’s needs were not satisfied his life and the life of his family would be in danger; a serious situation. Rashi provides the following commentary in which Moses says to God: “If I wait just a little longer, they will stone me.”¹³¹ Thus, the

¹²⁹ Peter Singer, *Animal Liberation*, 2nd ed. (New York: New York Review of Books, 1990), 7.

¹³⁰ Ibid., 15.

¹³¹ Rashi, “Commentary.”

idea that Moses feared an imminent stoning is clear. The leadership exhibited by Moses in this example can be portrayed as the manager who is a task master. He goes on to complete the request made by the people, after imploring God's intercession; the kind of leadership that is required when the needs of the people are placed first instead of the needs of the institutional structures or hierarchy. First things first, as the common saying goes.

As the story of Exodus continues, the LORD said to Moses "Go on ahead of the people, and take some of the elders of Israel with you." From this verse, we can conclude that God provided Moses with other people who could also serve as witnesses for what was about to occur.

The Oxford Companion to the Bible explains that in biblical terms, "witnesses are used to attest, contrast, and to verified proceedings."¹³² Witnesses are crucial in tense moments. The presence of onlookers seems to have had an effect on the crowds. From my personal experience, I have sensed that my presence on various occasions had diffused situations in which I stood observing what was going on around me. In a particular case, I saw how a young man missed the green traffic light at an intersection in Astoria, Queens, NY, due to the fact that an elderly person was in the crosswalk, and the young man had to stop his car. The young man came out of the car screaming at the elderly person because he had missed the light. A young woman inside the car just looked at her boyfriend who was misbehaving in front of the crowd. My wife, who was beside me, said to me 'let's go', but I replied, please wait. A few seconds afterwards, the young man looked at me and screamed: What at you doing here? I replied with a strong voice,

¹³² Bruce M. Metzger and Michael David Coogan, eds., *The Oxford Companion to the Bible* (New York: Oxford University Press, 1993), 805.

not screaming, I am a witness! It was at this time that other people intervened and they said ‘we too witnessed what happened’. The elderly man summoned up the courage to defend himself, and he replied to the young man in a very strong voice, ‘what do you say now? You, punk! Get out of here!’ The young man realized that he had made a fool of himself and run into the car and drove away. That is the power of witnessing. Moses needed a little support from his friends.

Rashi, in his comments concerning Moses taking some of the elders of Israel with him to see the Israelites, stated that the onlookers are required “for testimony, so that they shall witness that through you the water comes out of the rock, and they [the Israelites] will not say that there were water fountains there from days of yore.”¹³³ This interpretation does not seem to accord with the literal reading of the text where we would expect extensive moral support for Moses when he was under duress. It goes beyond the narrative to imply that through Moses, God provided water to the people. This example shows that there is power in the way we can interpret the biblical text.

The conclusions that can be made about *Exodus 17: 1-5* is that God provides water for the survival of the people and the animals. Even though the people seemed not to have faith in Moses or in God, in the end they witness another miracle in which they are saved from perishing of thirst as God finds the water for Moses. This is the text that instructs Moses what to do, and it describes such miracle: “I will be standing there in front of you on the rock at Horeb. Strike the rock, and water will come out of it, so that the people may drink.” Moses did so, in the sight of the elders of Israel” (Exodus 17:7).

¹³³ Rashi, “Commentary.”

Water came out of the rock and saved everyone from dying while the elders were there in the presence of all the Israelites.

Exegesis of John 4: 7 -14

The New Testament has numerous passages in which water is mentioned; as we move now to the exegesis of *John 4:7 -14*, let's consider the actual text:

A Samaritan woman came to draw water, and Jesus said to her, "Give me a drink." (His disciples had gone to the city to buy food.) The Samaritan woman said to him, "How is it that you, a Jew, ask a drink of me, a woman of Samaria?" (Jews do not share things in common with Samaritans.) Jesus answered her, "If you knew the gift of God, and who it is that is saying to you, 'Give me a drink,' you would have asked him, and he would have given you living water." The woman said to him, "Sir, you have no bucket, and the well is deep. Where do you get that living water? Are you greater than our ancestor Jacob, who gave us the well, and with his sons and his flocks drank from it?" Jesus said to her, "Everyone who drinks of this water will be thirsty again, but those who drink of the water that I will give them will never be thirsty. The water that I will give will become in them a spring of water gushing up to eternal life."

The narrative starts with a Samaritan woman who came to Jacob's well to draw water. It was customary for women in the first century to collect water for the family. This practice has not changed in two thousand years. According to UNICEF, presently, women and girls in developing countries spend 200 million hours every day collecting water.¹³⁴ The Samaritan woman is a marginalized person who was not allowed to mingle with Jewish people and especially Jewish men. When Jesus came to the Samaritan

¹³⁴ UNICEF.

woman and said to her “Give me a drink,” she most likely was perplexed. Jesus came to the area where the Samaritans lived and who were separated from the Jews. She perhaps knew that the protocol or the custom was being violated. There is an understanding that “the Samaritan woman belongs to a people who are subject to inherited social prejudice because of their origin, and, in her case, simply because she is a woman.”¹³⁵ It is noteworthy, that even though the Samaritan was not supposed to speak with a Jew, she goes on to have a dialogue with Jesus. It is possible that Jesus not only used the excuse of the drink of water to approach her, but to engage the Samaritan woman in the conversation.¹³⁶

The event, in which the Samaritan woman finds herself alone with a man, puts the woman in jeopardy of being misjudged. That might be the reason why she asked Jesus, “How is it that you, a Jew, ask a drink of me, a woman of Samaria?” The Samaritan woman was expressing her understanding of the status quo. The *Harper’s Bible Commentary* provides a possible explanation as to why Jesus came to Samaria; it claims that Jesus and his followers were going to Galilee and going through Samaria could accomplished the journey. No comments are made about the Samaritan woman being alone with Jesus.¹³⁷ However, it could be assumed that Jesus was thirsty and he needed water to drink. Thus, going to a well to get something to drink makes sense. Being thirsty is an uncomfortable experience. When I was a young man, I used to walk the streets of San Salvador, the capital of El Salvador situated in Central America. One time, as I was

¹³⁵ Theresa Okure, “Jesus and the Samaritan Woman (Jn 4:1–42) in Africa,” *Theological Studies* 70 (2009): 401-418, <http://cdn.theologicalstudies.net/70/70.2/10.1177.004056390907000209.pdf> (accessed August 30, 2017).

¹³⁶ Clinton M. Marsh, *Evangelism is ...* (Louisville, KY: Geneva Press, 1997), 111.

¹³⁷ James Luther Mays, *Harper’s Bible Commentary* (San Francisco: Harper & Row, 1988), 1052.

walking around, I became thirsty. My mouth became dry. I came to a puddle of dirty water and I felt force to drink. That action caused me to become sick. It is known that “everyone experiences thirst from time to time” and water is needed to prevent dehydration.¹³⁸ That was the reason why Jesus came to the well to seek water to drink. Clean water is needed for life.

Analyzing the decision made by Jesus to speak to the Samaritan woman indicates that he was breaking from the custom of the day. Jesus was also placing himself in a situation in which he could be accused of not following the rule of not to mingled with the Samaritans. From this standpoint, we could say that this was a progressive move by Jesus. He was proclaiming the fact that for God there is no longer a difference between Samaritans and Jews. Jesus was leading by example in breaking away from the status quo. Thus, Jesus opens the door to a new consciousness where racial differences can be diminished and may be extinguished.¹³⁹ It is worth mentioning that *The Oxford Dictionary of the Christian Church*, in its comments, shows Jesus as having sympathy towards the Samaritans.¹⁴⁰

After the Samaritan woman made her point with her questioning, Jesus answered “If you knew the gift of God, and who it is that is saying to you, ‘Give me a drink,’ you would have asked him, and he would have given you living water.” How could the

¹³⁸ Barry M. Popkin, Kristen E. D’Anci, and Irwin H. Rosenberg, “Water, Hydration and Health,” *Nutrition Reviews* 68, no. 8 (2010): 439–458, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2908954/> (accessed August 31, 2017).

¹³⁹ Examining the Nazi sympathizers’ acts of violence that erupted at the University of Virginia on August 11, 2017, shows that racial tensions are still alive in the USA. The example that Jesus put forward in speaking to the Samaritan woman to dialogue with the other is still not understood by the people who claim to follow the teachings of Jesus Christ.

¹⁴⁰ F. L. Cross and Elizabeth A. Livingstone, eds., *The Oxford Dictionary of the Christian Church*, 2nd ed. (London: Oxford University Press, 1974), 1231.

Samaritan woman know who was the person asking for water? Perhaps there was no way. However, according to the *Revised New Bible Commentary*, the Samaritan woman would have known that Jesus was a Jew by his speech.¹⁴¹

Following the conversation, we arrive at the point at which the woman said to Jesus, “Sir, you have no bucket, and the well is deep. Where do you get that living water? These questions are indicative that the Samaritan woman was referring to the water that one retrieves from the well. It is clear that Jesus does not have the required equipment to get the water out so that he could offer it to her.

At this point, the conversation took a new direction. Jesus positioned himself as the giver of living water. Water is needed for life. Both the Samaritan woman and Jesus have come together to this common place, Jacob’s well, where water can be obtained so that their thirst can be quenched and by it sustain life. Every living thing needs water; it is a common good we all need to share. The conversation, now, turns to the reason why both the Samaritan woman and Jesus have come to the well: to share that living water. We need water to fulfill our human need in the here and now. However, Jesus is also talking about the living water of eternal life when he says: “Everyone who drinks of this water will be thirsty again, but those who drink of the water that I will give them will never be thirsty. The water that I will give will become in them a spring of water gushing up to eternal life.” The Samaritan woman at this point is eager to receive that water that can bring eternal life. As a Christian lesson to take away from this text, Fr. Frei Betto

¹⁴¹ Donald Guthrie and J. A. Motyer, *The Eerdmans Bible Commentary*, 3rd ed. (Grand Rapids, MI: W.B. Eerdmans, 1987), 938.

points out that Jesus demonstrates that it is God who moves toward humanity and not the other way around.¹⁴² Jesus approaches the Samaritan woman out of compassion and love.

The biblical passages, Exodus 17: 1-5 and John 4:7 -14, can be compared and examined to gain some understanding of the development of a creation theology in which nature is considered the center of the universe for the well-being of all created beings.

After examining the two biblical passages, it is clear that the single element that brings them together is clean water. This can lead to an interpretation that can shed light on the development of a creation theology. For example, in the Exodus (17: 1-5) passage, the people confronted Moses with the statement: “Why did you bring us out of Egypt, to kill us and our children and livestock with thirst?” In this question, we observe that water is needed for life for all created beings. Likewise, in the John passage (4:7 -14), there is an emphasis that water is needed for sustaining life. As human beings increase their consciousness about the need to care for the natural water sources, we can conclude there that both biblical passages are calling us to be concerned about all living creatures. From this we deduce that people adhere to the belief that it is imperative to develop a creation theology in which human beings put nature at the center of the universe, and not only in for the needs of humans, but instead to take care of the natural resources.

This approach departs from the Genesis story in which humanity is given charge of the natural resources. Instead, humanity is to care for the well-being of the land. In this alternative reality, humanity becomes concerned for the natural resources that are shared by all living creatures. In short, if humanity assumes the responsibility of caring for the natural resources, this action will allow life to flourish. On the other hand, if humanity

¹⁴² Frei Betto, *Fidel y la religión: conversaciones con Frei Betto sobre el marxismo y la teología de la liberación* (Buenos Aires: Ocean Sur, 2006), 55.

continues on the path of consuming the natural resources in a destructive fashion and increases the amount of contaminants in the air and water, the outcome is predictable: the destruction of life.

Humanity needs to be reminded that the exploitation of the earth's resources has increased dramatically since "Globalization amplified and diversified patterns of power and privilege; natural resources were extracted at an unprecedented rate and scale."¹⁴³ In many cases, during the extraction of the earth's resources, the ground water becomes contaminated, as in the case of mining and fracking. This contamination must be reduced and controlled. Water is a basic and "universal solvent in which all reactions of living matter take place and animals that live at sub-zero temperatures survive only because the heat generated by their metabolism prevents the cells from freezing."¹⁴⁴ Water molecules sustain life.

Compounding the situation of at-risk water supplies, there are emergent contaminants that should be studied to understand their impact on the water supplies in our communities. There is a pressing need for Christians to start practicing a creation theology for all living creatures to survive. Theology should not only be concerned "with historical revelation and personal experience, it must include a theology of nature which does not disparage or neglect the natural order."¹⁴⁵

¹⁴³ H. Christiana Z. Peppard, *Just Water: Theology, Ethics, and the Global Water Crisis* (Maryknoll, NY: Orbis Books, 2014), 1.

¹⁴⁴ Charles A. Pasternak, *Quest: The Essence of Humanity* (Chichester, UK: Wiley, 2003), 46.

¹⁴⁵ Ian G. Barbour, *Issues in Science and Religion* (New York: Harper & Row, 1971), 453.

CHAPTER 6

SOCIO-ECONOMIC IMPACT OF WATER IN COMMUNITIES

Socio-Economic Analysis

What are the factors that influence how a community's water is serviced and what the people of West Orange, NJ, need to know in terms of cost?

“Goods” is one of the main focuses of economics. For economists, there are distinctions between the categories of goods, such as man-made versus God-given ones. However, once the goods are introduced for the market, they are treated in the same or in similar manner as objects for sale.¹⁴⁶ This may be also the case for water. Thus, economists might treat water as any other good in the market place.

When comparing water to other commodities and utility services, the cost of water has several distinctive features which complicate its supply. For example, water is bulky and expensive to transport relative to its value per unit of weight. However, the transportation infrastructure for water is far less extensive than that for more valuable liquids such as petroleum. Although water is relatively expensive to transport, it is relatively cheap to store when compared to electricity.¹⁴⁷

It important to emphasize that the prices which most users pay for water reflect, at best, its physical supply cost and not its scarcity value. Users pay for the capital and

¹⁴⁶ E. F. Schumacher, *Small Is Beautiful: Economics as If People Mattered* (New York: Perennial Library, 1975), 49.

¹⁴⁷ W. M. Hanemann, “The Economic Conception of Water,” https://gspp.berkeley.edu/assets/uploads/research/pdf/The_economic_concpetion_of_water.pdf (accessed October 31, 2017).

operating costs of the water supply infrastructure but, in the United States and many other countries, there is no charge for the water per se.”¹⁴⁸

Water in itself has an intrinsic economic value as well as a public value. There are estimates that indicate that water supply is optimistic, but there is another projection that points to the fact that there is a risk for huge shortages of pure water supplies.¹⁴⁹

Factors, such as water scarcities, influence the price for water; there are other costs associated to the acquisition, treatment, water quality testing, and the transport of the water to the various communities also increases the cost of the water. Note that the cost for testing water quality ranges from a few dollars to perhaps a few thousand dollars. This is an area that requires further study in order to properly estimate the cost hike due to periodic testing and treatment of drinking water.

According to Charles W. Howe, Professor Emeritus, Department of Economics Faculty Research Associate, Institute of Behavioral Science, University of Colorado, the principal “roles of water price are: (1) the ‘economically efficient’ allocation of existing supplies in the short term; (2) the generation of adequate revenues for the operation, maintenance and expansion of the water system; and (3) the ‘equitable’ treatment of water users.”¹⁵⁰

¹⁴⁸ Ibid.

¹⁴⁹ Johan Norberg, *In Defense of Global Capitalism* (Washington, DC: Cato Institute, 2003), 60.

¹⁵⁰ Charles W. Howe, “The Functions, Impacts and Effectiveness of Water Pricing: Evidence from the United States and Canada,” *Water Resources Development* 21, no. 1 (March 2005): 43-53, https://www.colorado.edu/geography/class_homepages/geog_4501_s12/readings/howewaterpricing.pdf (accessed October 27, 2017).

There are other expenses that are incurred in the process of providing water to customers. For example, there is the “cost of reservoirs, canals, water transmission lines, urban distribution networks, pumping stations,” and so on.”¹⁵¹

When the water supplied to communities is run by private companies such as the case of the Town of West Orange, NJ, there are additional cost added to the value of the water in terms of expenses for salaries and profit margins. Privatization of water supply and its distribution could have mixed results:

Although water privatization has been successful in many countries, it can threaten established use patterns by increasing the costs of water or transferring ownership of water sources to private companies without proper local governance structures. Privatization also makes water supply vulnerable to market forces which can conflict with societal expectations.¹⁵²

In the case of city water users, they “should be metered and, in most cases, charged according to an increasing block rate schedule that reflects near term future raw water development and opportunity costs as well as treatment and distribution costs.”¹⁵³

For the residents of West Orange, NJ, the price of the water is established by the New Jersey American Water company, which also manages all expenses incurred in the maintenance, testing the water quality and upgrades to the water infrastructure. On its webpage, the company has an entry under the title “Your Water Bill at Work” where it states that:

¹⁵¹ Dale Whittington and W. M. Hanemann, “The Economic Costs and Benefits of Investments in Municipal Water and Sanitation Infrastructure: A Global Perspective,” UCB CUDARE Working Papers (Berkeley: University of California Department of Agricultural & Resource Economics, 2006), <https://ageconsearch.umn.edu/bitstream/7159/2/wp061021.pdf> (accessed October 27, 2017).

¹⁵² “Global Water Security,” https://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf (accessed October 31, 2017).

¹⁵³ Ibid.

New Jersey American Water invests approximately \$350 million annually — nearly \$1 million a day — in its treatment and distribution facilities. Large investments, such as water plants and tanks, have high visibility, however, a significant portion of our investment also goes toward upgrading underground water mains. These projects help to improve water quality, service reliability and fire protection for the communities we serve. At the same time, the cost of water service remains less than a penny a gallon - an exceptional value.

It is recognized that private water provision works in some places, but it has some potential problems: (a) consumers cannot easily verify the quality of the water; (b) even though the private water providers could guarantee clean water, the customers aren't always willing or able to spend enough to make such purity profitable.¹⁵⁴ These potential problems might not be an issue in wealthy communities, but it might be of great concern in poor wards where the residents do not have the money to buy a water filter for their drinking water.

According to The National Intelligence Council's 2012 report on Global Water Scarcity, the following tariffs for water are estimated: "for industry and households, water prices in developed countries range from \$0.60/cubic meter to more than \$3/cubic meter; water for agriculture in most countries is priced at approximately \$0.10/cubic meter."¹⁵⁵

Water main breaks may also add to the cost of the water for consumers as expenses are incurred by townships for the repairs and maintenance required to keep the water flowing to the residents.

Any economic enterprise requires money to conduct its business. In the case of the water main breakage, there are expenses that are not covered. For a specific end-to-

¹⁵⁴ Edward L. Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (New York: Penguin Press, 2011), 99-100.

¹⁵⁵ "Global Water Security."

end project of this type, there are expenses associated with: (1) excavation of the earth using machinery; (2) repairing the breakage; (3) placing concrete; (4) curing concrete; (5) finishing concrete surface; (6) and cleaning up the site.¹⁵⁶ It is noteworthy that when water mains breakages occur, “the cost of the maintenance and repairs will vary considerably with the type of equipment, the service to which it is assigned, and the care which it receives.”¹⁵⁷ The incurred “financial costs are actual out-of-pocket costs. These include the capital costs from construction, operations and maintenance costs, and debt service repayments”¹⁵⁸ that could vary depending on market conditions. The financial responsibilities incurred in these types of repairs mainly impact the water bill indirectly, in the form of tax increases. Added to this cost, there may also be interest that townships have to pay on loans made to cover for the expenses of the water main repairs and for other hired help. In a similar vein, there are other expenses incurred for replacing aging water infrastructure as indicted by the NJ American Water Company’s quote from the 2016 Report Card by the American Society of Civil Engineers, in which it is stated that:

New Jersey has \$933 million in drinking water infrastructure needs and \$17.48 billion in wastewater infrastructure needs over the next 20 years. We are jeopardizing our quality of life today and for future generations if we fail to properly maintain this vital infrastructure. That’s why New Jersey American Water, proactively replaces aging pipe and upgrades our facilities to continue to deliver reliable service, high-quality water and fire protection.¹⁵⁹

¹⁵⁶ R. L. Peurifoy, *Construction Planning, Equipment, and Methods*, 4th ed. (New York: McGraw-Hill, 1985), 24.

¹⁵⁷ *Ibid.*, 71.

¹⁵⁸ Economic Analysis Task Force for Water Recycling in California, “Guidelines for Preparing Economic Analysis for Water Recycling Projects,” https://watershed.ucdavis.edu/files/biblio/EAGD_Final_V2003_05182011.pdf (accessed October 26, 2017).

¹⁵⁹ American Water New Jersey, “Water System Updates,” <https://amwater.com/njaw/water-quality/system-updates> (accessed November 1, 2017).

This forecasted expense will affect the price of the water for West Orange residents that cannot be determined at the present time as the price of equipment varies from time to time. Additional costs will of course be added to the price of water delivery as other problems with the water infrastructure require unforeseen repairs.

According to the United States Environmental Protection Agency (EPA), there are approximately 240,000 water main breaks every year, representing about 658 water breakages per day (see Figure 3).

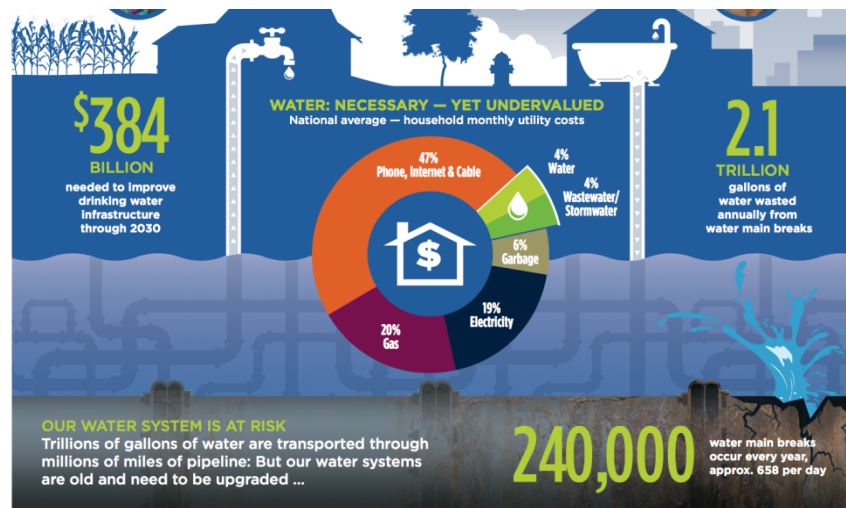


Figure 3. Water Main Breaks¹⁶⁰

¹⁶⁰ Ibid.

Another point that the EPA makes is that “severe weather and aging pipes threaten our water and wastewater services every day.”¹⁶¹ The EPA also emphasizes that “2.1 trillion of gallons of water [are] wasted annually from water main breaks.”¹⁶² This indicates that water main breakages and the water waste are occurring constantly in the United States, and townships must be prepared to come up with the economic and human resources to resolve the situation.

These are expenses that will have to be incurred in the future as indicated by the United States Congress, and the EPA, which “reported that the total needs of America’s publicly owned treatment work for the next 20 years (as at January 1, 2004) were \$202.5 billion (USEPA 2008). The World Business Council for Sustainable Development estimates that the total costs of replacing ageing water supply and sanitation infrastructure in industrial countries may be as high as \$200 billion a year.”¹⁶³

Natural disasters such as hurricanes, storms, earthquakes, and similar catastrophes have an impact on the price of clean water. Here are some examples of disasters in the past decade: “the Indian Ocean tsunami in 2004, Hurricane Katrina in 2005, the Sichuan earthquake in China in 2008, the Haitian earth-quake in 2009, and the Japanese earthquake and tsunami in 2011.”¹⁶⁴ From August to September 2017, Hurricanes Maria, Irma, and Harvey made landfall in various states in the United States, and part of the

¹⁶¹ EPA, “Water: What is it Worth to You?” https://www.epa.gov/sites/production/files/2016-01/documents/epa_wsd_infographic_081815.pdf (accessed October 26, 2017).

¹⁶² Ibid.

¹⁶³ Ibid.

¹⁶⁴ Derek Kellenberg and A. Mushfiq Mobarak, “The Economics of Natural Disasters,” http://faculty.som.yale.edu/mushfiqmobarak/papers/disasters_annreview.pdf (accessed October 27, 2017).

Caribbean islands, including Puerto Rico.¹⁶⁵ These are powerful reminders of the magnitude of the economic consequence of such disasters, and their economic consequences cannot be easily estimated. Some estimates show figures in the billions of dollars.

¹⁶⁵ Diego J. Rodriguez, “The Use of Economic Analysis for Water Quality Improvement Investments,” <http://www.rug.nl/research/portal/files/2669240/12complete.pdf> (accessed October 30, 2017).

CHAPTER 7 EVALUATION PROCESS

This chapter presents the principal aspects of an evaluation process that was followed to bring the Water Quality project to a successful conclusion.

The Evaluation Plan

An evaluation plan was implemented during the execution of the God and Science project. The evaluation plan served as a tool to measure the progress of the strategies, goals, ministerial competencies and the project itself. According to the resource page *My Environmental Education Evaluation Resource Assistant* (MEERA) at the University of Michigan, “a well-planned and carefully executed evaluation will reap more benefits for all stakeholders than an evaluation that is thrown together hastily and retrospectively.”¹⁶⁶ Therefore, establishing the initial steps for an evaluation plan, during the project proposal period, helped in guiding the implementation of the Water Quality project. As the project moved forward, the evaluation plan tracked the progress made, and uncovered potential conflict areas that impacted the project negatively. This constant examination of the project progress allowed for corrections and adjustments. An evaluation plan could be considered as an inventory of a project that needs to be taken on a regular basis. Alfred North Whitehead, the British mathematician and philosopher, states that anyone who “consciously reviews the events of the day is subconsciously

¹⁶⁶ MEERA, “Evaluation: What is It and Why do It?” <http://meera.snre.umich.edu/evaluation-what-it-and-why-do-it#good> (accessed October 13, 2017).

projecting them against the penumbral welter of alternatives.”¹⁶⁷ In the case of a project, an inventory of its progress can result in events or actions that can be taken to improve the odds for a successful project completion.

The Importance of a Team Leader

A member of the project team was selected as the team leader. The team leader helped in guiding the evaluation process of the project. Adhering to the recommendation and leadership of the project team, I was able to effect the realization of the Water Quality project in West Orange, NJ. The team leader became intimately involved in monitoring the progress and execution of the goals, as well as the strategies to be achieved for the project. There were regular meetings in which the project was reviewed. In addition, the project team planned and was convened on a monthly basis to monitor and provide feedback on the progress of the God and Science project. The regular project meetings allow for the project events to be planned and evaluated for progress and redirection to adjust changes that could guarantee a successful execution.

It is imperative to implement an evaluation process since it keeps the project on track. After reviewing the planned schedule of activities for the project, it was discovered that some of the dates were not realistic so a revised schedule was agreed on so that the project could be completed on time, and thus allowing for the writing of the dissertation.

Log Book Notes

It was found that maintaining a log book, a record keeping of the meetings, and having a regular examination of target dates for completing the various stages of the project were crucial. One important point to mention here is that when working on action

¹⁶⁷ Alfred North Whitehead, *Gifford Lectures*, corrected ed., vol. 1927-28, *Process and Reality: An Essay in Cosmology* (New York: Free Press, 1978), 187.

items that result from pending issues, it is crucial to avoid conflicts and to keep stakeholders informed of the planned activities. For example, during the testing phase of the quality of water, it was mandatory to seal the faucets where the “first draw” of the water samples was to be collected for the testing. To accomplish this requirement, signs were posted in the kitchen, the bathrooms, and other places at Holy Trinity Episcopal Church. The principal point in sealing the faucets and not allowing the water to be used before the “first draw” of the water samples were collected was to guarantee that the water test results would be accurate in the reporting of the Water Quality.

Verification of Water Test Results

The lead content water test results obtained from Rutgers University and Water Pro Laboratories were compared with the EPA Federal Standards, and they showed to be in compliance. Testing the Water Quality and verifying the Water Test Results must be an on-going activity for individuals and organizations that are concerned with the Water Quality in their communities. It is important to review the “Alerts” posted on the NJ American Water webpage regularly in order to be informed about the status of the water in West Orange, N.J.

Analyzing the Responses of the Questionnaires

A battery of questions was formulated to find out people’s awareness about the quality of the water they consumed in West Orange, N.J. The questionnaires were designed with the help of a professional in order to develop the appropriate questions to address the Water Quality in West Orange, NJ. The sample population who would be asked to fill out the questionnaires was targeted to be 100. However, only 67 questionnaires were collected. The data was collected from two groups comprised of a Spanish-speaking group of 26 participants and an English-speaking group of 41

participants. The sample number was small but it provided data from where trends could be derived and provided an indication of what the people knew about their Water Quality.

Site Team and Project Team Participation

The requirement to have at least one-third of the site team and project team members at events for the God and Science project was not accomplished. However, in at least three events, the presence of site team and project team members was accomplished. Members of the leadership at Holy Trinity Episcopal Church, as well as the English and Spanish congregations attended the sermons delivery and the presentations on the Water Quality project. The Rev. Dr. Peter Jackson, academic advisor, was present during the delivery of the sermons on the Water Quality theme and other presentations. In addition, at least three members of the project team were present and provided support during the execution of the Water Quality Project.

It was important in the evaluation process to include a checklist of all events to be sponsored and to verify that the appropriate funds were obtained and allocated for the Water Quality project to be successful.

CHAPTER 8

MINISTERIAL COMPETENCIES

The Process

The Site Team members convened on multiple occasions to evaluate the ministerial competencies of the author, the Rev. Miguel A. Hernandez.

Competencies Chosen for Development

From among the various areas of ministerial competencies examined, I chose three key areas to focus on with a view to further developing my performance as a minister in a multicultural and multilingual environment. Those competencies were: theologian, a preacher, and a community leader.

Theologian

To develop my competency as a theologian, I participated in multiple biblical engagements, theological reflections, and discussions. I also pursued several strategies to achieve my goal in this specific competency. Towards that end, I read and analyzed relevant books and articles, and reviewed other references by a variety of distinguished and renowned authors who have written extensively about theology, and the environment. In addition, I taught Biblical classes at the seminary level, and through enlightened discussions gained a deeper insight of varied theological themes. A review of that material is presented below.

Paul Collins influential book *Judgment Day* (2010) has been a foundation for me to gain a more profound understanding of the many ways in which the ecology is being

destroyed, and propelled me to be concerned about the issue of climate change, and its effects.¹⁶⁸ Reading this book helped me to narrow the scope of the project to the problem of water pollution since it affects all aspects of existential life and to draw attention to one of the most urgent problems confirmed: “Potable water is running short in some regions” of the planet as a result of global warming.¹⁶⁹

Another significant trend that this book pointed out to me is how the mismanagement of natural resources has impacted the ecosystems. For example, the diversion of fresh water from the Amu Dyria and Syr Dyria Rivers in the Central Asian republics of Uzbekistan, Tajikistan, and Kazakhstan by the Soviet Union in the 1950s and 1960s resulted in detrimental effects to the environment. As a consequence of this careless act, “all native endemic species have completely disappeared; the area is now an arid, toxic desert, the result of a combination of salt, sand, chemicals, and pesticides. Drinking water has disappeared” in the area.¹⁷⁰ I believe that all societies should do their utmost to avoid the mismanagement of natural resources at all times, and to this end, governments should enact and implement laws that protect the environment so as to prevent potential catastrophic events that could threaten water supplies globally.

In theological terms, *Judgment Day* also highlights the inter relationship between the environment and theology, creating a new consciousness in which “our sense of oneness with the earth” is experienced.”¹⁷¹ In the exercise of this new reality, we feel the

¹⁶⁸ Paul Collins, *Judgment Day: The Struggle for Life on Earth* (Maryknoll, NY: Orbis Books, 2010).

¹⁶⁹ Ibid., 75.

¹⁷⁰ Ibid., 134.

¹⁷¹ Ibid., 227.

joy, growth, and suffering of the planet. Thus, we are invited to take responsibility for the well-being of the Earth and its living creatures.

But if Paul Collins was instrumental in awakening my consciousness of the risks to the environment, the Brazilian theologian, philosopher, and university professor, Leonardo Boff, has been my inspiration and guiding light in providing a sound philosophical and theological framework for me to deepen my understanding of and concerns for the ecology, especially the gentle stewardship of nature, and Water Quality in particular. Boff's soft voice and well-calibrated analysis have been clear in depicting the direction that humanity needs to take to survive as a species.

Critical of the capital system, Boff states, in his article, *The Earth Will Defeat Capitalism* (2016), that “since society has been commercialized and turned everything, even the most sacred things, such as human organs, water and the capacity of flowers to be pollinated, into an opportunity to gain wealth, most countries feel obliged to participate in the globally integrated macro-economy,” ignoring the essential collective wellbeing of people.¹⁷² Boff goes on to say that since the Mother Earth “is about a living super-Being (Gaia), finite, with scarce goods and services, and now infirm, but still combining the elements that guarantee the physical, chemical and ecological bases for reproducing life, this process of excessive degradation could cause an ecological-social collapse of Dantesque proportions.”¹⁷³ To me, this is a prophetic voice that makes an amplified echo in my consciousness, which informs me that I need to heed the message and take decisive action. I concur that having access to information alone is insufficient; I

¹⁷² Leonardo Boff, “The Earth Will Defeat Capitalism” (2016), <http://www.tikkun.org/nextgen/the-earth-will-defeat-capitalism> (accessed August 13, 2017).

¹⁷³ Ibid.

recognize the need to disseminate the great concern about the ongoing decay and destruction that the Earth is subjected to and the detrimental effects on living systems on the planet.

Boff's 2017 article, *An Ethics for Mother Earth*, led me to conclude that a new theology of the Earth is a pressing priority. It seems to me that the call is not just for an ethics of the Earth, but a stewardship spirituality that "is rooted in cordial and sensible reason. From there comes the passion for caring and a serious commitment to love, responsibility, and compassion for our Common Home," our Earth.¹⁷⁴ In short, I understand that humanity is being called to action by loving the Earth's living creatures and maintaining the proper order of our ecological systems so that life can flourish. Moving forward, Boff is evidently urgently crying out for a spiritual conversion in which the needs of the planet are put first and foremost, instead of individualistic ideals that reign in some societies as a result of personal gratification and for capitalist objectives to produce profits for the financial markets.

In a similar vein of thought, some of the ideas of Leonardo Boff to save the planet have been incorporated in a document called *The Earth Charter*.¹⁷⁵ This document shows that the Earth is alive, providing life to all types of interrelated systems, and calls upon humanity to genuinely reflect on that fact when it states: "The resilience of the community of life and the well-being of humanity depend upon preserving a healthy biosphere with all its ecological systems, a rich variety of plants and animals, fertile soils,

¹⁷⁴ Leonardo Boff, *An Ethics for Mother Earth* (2017)
<https://leonardoboff.wordpress.com/2017/04/06/an-ethics-for-mother-earth/> (accessed August 13, 2017).

¹⁷⁵ UNESCO, "The Earth Charter,"
http://www.unesco.org/education/tlsf/mods/theme_a/img/02_earthcharter.pdf (accessed August 15, 2017).

pure waters, and clean air.”¹⁷⁶ Thus, the call is for all humanity to get involved in recognizing that the Earth supports life, and working to maintain a balance among all the ecosystems that are needed for the perpetuation of life and its flourishing. Implicit in this conjuncture, people should have the inalienable “right to potable water, clean air, food security, uncontaminated soil, shelter, and safe sanitation, allocating the national and international resources required.”¹⁷⁷ National governments around the world should collectively work toward this objective as the highest ideal to protect life in the short and long term.

The document also explores how the disparity of the present system of production and distribution of goods is negatively affecting the natural resources of the Earth. In a very clear and precise evaluation of the problem, the document states: “The benefits of development are not shared equitably and the gap between rich and poor is widening. Injustice, poverty, ignorance, and violent conflict are widespread and the cause of great suffering.”¹⁷⁸

From a theological perspective, *The Earth Charter* “affirms faith in the inherent dignity of all human beings and in the intellectual, artistic, ethical, and spiritual potential of humanity.”¹⁷⁹ In this context, the dignity of all human beings is understood as being independent of people’s religious belief. In my estimation, the document is making the point that all people are invited to be informed about the need to care for the Earth, since its holistic welfare is connected to the wellbeing of every living creature on the planet.

¹⁷⁶ Ibid.

¹⁷⁷ Ibid.

¹⁷⁸ Ibid.

¹⁷⁹ Ibid.

The Earth Charter closes by stating that in order for change to occur, a holistic change of mind and heart is imperative. Likewise, “It requires a new sense of global interdependence and universal responsibility. We must imaginatively develop and apply the vision of a sustainable way of life locally, nationally, regionally, and globally.”¹⁸⁰

My understanding of *The Earth Charter* is that the Earth is being exploited and attacked on a continuing basis by the out of control demand for its natural resources in order to maintain a system of production of finished goods that is unsustainable, and a change in direction and calibration must occur for all living creatures to continue to survive. That is, in my view, a kind of Liberation Theology for the Earth is needed. As a Christian believer, I agree that the Earth must be saved from the current destruction and exploitation since God created it for the sustenance of all living beings (Genesis).

The development of my theological competency also benefited from my attendance at several theological lectures on the environment in New York and New Jersey to inform my perspective as well as my research. I attended the Trinity Institute 2017 Forum, in which the principal theme was Water Justice.¹⁸¹ At this Forum, various ordained and lay leaders spoke from theological and social perspectives about the sacredness of water and its use in communities. During the presentations, participants engaged in inquiry, dialogue, and reflection. One key point I gained from the dialogue was that, although water is used for purifying, for washing, and for sustaining life, it is not accessible to many people on the planet due to lack of resources in many instances to provide clean water, especially to poor people.

¹⁸⁰ Ibid.

¹⁸¹ Trinity Church, <https://www.trinitywallstreet.org/trinity-institute/2017/home> (August 13, 2017).

As I visited the various rooms and display areas, I realized that access to potable water had become a critical issue globally. Some of the presenters and speakers came from as close as Flint, Michigan, and as far away as New Zealand. Ms. Nakiya Wakes, an activist and spokesperson through Flint Rising, a coalition of community organizations and allies, gave a powerful testimony of how her children were affected by the presence of lead in the water in the town of Flint, Michigan. She is committed to speaking out on the issue of water pollution to ensure that people directly impacted by such pollution fight for social and environmental justice in their communities. It is important to mention that Ms. Nakiya Wakes' story has been reported by the Guardian newspaper, which stated that when the children's blood was tested "it registered at a concentration of 5 micrograms per deciliter of blood, a level deemed by the Centers for Disease Control and Prevention to be "much higher than most children's levels."¹⁸² The Most *Reverend* Dr. Winston Halapua, Archbishop and Primate of the Diocese of Polynesia and Aotearoa New Zealand, led a ritual about water in his native language. From these two speakers, I arrived at the sense that clean water is not just a commodity, but that it is a sacred element that allows life to develop and all living beings to prosper and multiply.

Having listened to the Water Justice presentations, I concluded that the issue of Water Quality is one of the most important topics calling for our involvement. Concern about fresh water is prevalent around the world. An important outcome of this forum for me was my total commitment to continue working on the issue of Water Quality in West Orange, NJ, and other places.

¹⁸² Ryan Felton, "'It's Affected Everybody': Flint children on the Frontline of the Water Crisis," *The Guardian* (March 24, 2016), <https://www.theguardian.com/us-news/2016/mar/24/flint-children-water-crisis-lack-of-data-lead> (accessed September 10, 2017).

To further my understanding of theology, I continued to gain knowledge in the area of theological studies by attending the Newark School of Theology, under the mentorship of Dr. Douglas Bendall, where I also have been teaching classes in theology since 2009.¹⁸³

In addition, I assisted in efforts to bring theological education to the Anglican Episcopal Diocese of El Salvador, where a theological seminary was launched in January 2017.¹⁸⁴ I was invited to the inauguration of the El Salvador seminary as the keynote speaker to deliver a talk on the theme “*Jesús dice: Ven y Sígueme*” (Jesus says: Come and Follow Me).¹⁸⁵ In addition, I was offered the opportunity to teach a class on the Old Testament and a class in the New Testament.¹⁸⁶ To close the cycle of the first year of classes, in December 2017, I had the opportunity delivered the last New Testament class to the seminarians in El Salvador. I also was given the opportunity to address the clergy of the Episcopal Diocese of El Salvador where I spoke on the theme: The Leadership of Jesus.¹⁸⁷ For me, theological education has become an important component in my ministry.

Some of the learning outcomes of my involvement in teaching theological classes are the examination of various theories, formulation of syllabi, selection of textbooks,

¹⁸³ At the Newark School of Theology (NST), lay and ordained ministers are formed and educated to become deacons, and to provide continuing theological education to ministers in the City of Newark and its vicinity.

¹⁸⁴ An article on the foundation of the *Seminario Episcopal Anglicano de El Salvador* can be found at <https://www.episcopalcafe.com/a-seminary-is-born-in-el-salvador/>.

¹⁸⁵ A copy of the presentation in Spanish can be found at the following link <https://www.scribd.com/document/335423231/Jesus-dice-Ven-y-Sigueme>

¹⁸⁶ Currently, there are six seminarians who are being formed and educated to become priests in El Salvador. Four of the seminarians are women.

¹⁸⁷ A reflection of the mission trip to El Salvador can be found at: <https://www.episcopalcafe.com/startup-seminary-in-el-salvador-marks-one-year/>.

preparation for the class, and expansion of the network of colleagues in the field who contribute to the teaching ministry.

In the preparation for teaching the Old Testament and New Testament classes, I had the opportunity to read the Bible carefully and methodically. This exercise allowed me to gain insights into the biblical texts that I did not observe before. As a result, I am integrating the biblical narratives in the classes that I teach, as well as, incorporating the lessons learned during sermon preparation. This methodological exercise affords more depth analysis in the examination of the biblical text.

During the discussions with the students, I used various materials to help them in the comprehension of the biblical passages. In some cases, I provided a written explanation of the topic being discussed. Once a Biblical Dictionary was available to the students in Spanish, I assigned them readings from the dictionary. When students had questions, I provided the best possible answers that I could formulate and, in some cases, I told the students that I would investigate the issue further and provide them the answer at the next class.

The theme of water can be found in many texts of the Bible, starting with the Book of Genesis. Students were motivated to reflect on this topic and to discuss it in class. Some of the comments made by the students indicated the level of their concern about the lack of potable water in their communities.¹⁸⁸

In retrospect, I can say that after having spent time learning and assimilating the experience of new theological concepts and perspectives, I can attest that I am better able

¹⁸⁸ Some of the seminarians are peasants who work on small farms where there is no running water, and they know firsthand of the importance of water to sustain life. This is a serious issue for the students in El Salvador.

to see that God is concerned not just about human beings, but about all living creatures who are part and parcel of the Earth, our Common Home.

Preacher

Preaching is another competency that I have been working on in order to improve the art of delivering sermons with impact.

To this end, I have prepared and delivered a series of sermons in which I conveyed the message of the importance of caring for the ecology of the planet and inspired the congregation to think critically about the issue of Water Quality in West Orange, NJ.

I have benefited and learned from well recognized and respected preachers. I searched for sermon lectures on-line, and I dedicated a good portion of my time listening to those sermon lectures where key points are made about what constitutes good preaching.

One of the preachers who influenced me is Pastor Dr. Timothy J. Keller, founder of the Redeemer Presbyterian Church in New York City. I studied the key points that Dr. Timothy J. Keller made during the John Reed Miller Lecture Series on Preaching, entitled “What is Good Preaching?” at the Reformed Theological Seminary.¹⁸⁹ In a very eloquent and humorous way, Dr. Keller offers sermon illustrations in which he states that preachers have the responsibility to prepare their sermons, and that it is their “job for the sermon to be good.”¹⁹⁰ From Dr. Keller’s exposition, I also learned that in writing a good sermon, one has to spend time studying the passage, setting the proper context, checking

¹⁸⁹ Timothy Keller, “What is Good Preaching,” (lecture Reformed Theological Seminary, November 24, 2014), <https://www.youtube.com/watch?v=hUE7ksPzju8> (August 14, 2017).

¹⁹⁰ Ibid.

for accuracy, and verifying the proper use of language. One of the lessons that I took away from this lecture was that, as a preacher, I have the responsibility to craft, as well as to revise the sermon for contemporary application. I also arrived at the conclusion that an effective sermon preparation takes time and discipline. Another relevant precept that I learned from viewing the lecture about good preaching is that during the delivery of the sermon God will touch congregants in ways that are unknown to me or to others.

Another method that I am following to improve my delivery of sermons is to listen to congregants' input. From this perspective, I have adopted the art of 'active listening' so that people can also hear me after they have given me some feedback.¹⁹¹ Feedback is crucial in connecting me to others. In this sense, I relate to others and their world. Thus, my experience is based in the world around me, and I can tailor the sermons with material necessary for a diverse audience.¹⁹²

One parishioner told me that I need to slow my cadence when I am delivering my sermon. I have become aware of this concern, and I am slowing down as I deliver the sermon, especially when I am delivering the sermon in English. To improve my speech, I am consulting sources that provide recommendations as how to project the voice, maintain a good modulation and rate of speech.¹⁹³

Another congregant let me know that I need to pay attention to the way I enunciate syllables. In this regard, I have been proactive and sought the help of a professional speech professor for a few sessions, in which I was evaluated and given

¹⁹¹ George G. Hunter, *Church for the Unchurched* (Nashville: Abingdon Press, 1996), 163.

¹⁹² Joseph O'Connor and Ian McDermott, *The Art of Systems Thinking: Essential Skills for Creativity and Problem Solving* (London: Thorsons, 1997), 222.

¹⁹³ Morton Cooper, *Change Your Voice, Change Your Life: A Quick, Simple Plan for Finding and Using Your Natural, Dynamic Voice* (New York: Barnes & Noble, 1985), 20.

pointers so that I could improve the sermon delivery during Mass. A third person provided positive feedback, indicating that the sermons that I delivered were teachable moments for her, and helped her more fully to understand some areas and concepts of the Bible that were difficult to grasp. This reminds me that as a preacher, I must respond to people's input and sensitivity by opening the window to my soul so that they too, can be the recipients of the work of God's grace in the church.¹⁹⁴

An additional technique that I have adopted to improve the delivery of my sermons is the practice of viewing and reviewing the sermons that I have video recorded. When I examine the videos of the sermons, I can observe my performance in real time. I have noted the posture that I take, and the expressions that I make with my hands and my head. As I continue to review my gestures in the pulpit and in public, I am gaining more confidence in public speaking in general. Seeing myself on the computer terminal has made me more relaxed and my demeanor more natural as I effect to changes in the performance and delivery of sermons. Thus, examining the videos has provided me a window to see myself in another dimension just as the congregants and people see me.

Given the fact that I am a Latino Minister in the United States, I am deeply involved and interested in learning how to serve our congregants who are monolingual (Spanish) and bilingual (English and Spanish). The "waves of recent immigrants with their fertility are creating a difference and diverse society" which implies that faith leaders have to prepare the way so that these newcomers can be welcomed in the community in which English might not be the primary language.¹⁹⁵ Existing demographic

¹⁹⁴ Donald P. Smith, *How to Attract and Keep Active Church Members* (Louisville, KY: Westminster/John Knox Press), 21.

¹⁹⁵ Marsh, *Evangelism Is...*, 63.

reporting indicates that both monolingual and bilingual congregations are present in most cities in the USA. Therefore, “effective preaching must always have bicultural and bilingual dimensions” to be able to respond to the needs of diverse congregants.¹⁹⁶ When church leaders recognize the pressing need to serve multicultural and multilingual groups, they adapt new approaches to reach out to them and to serve them. The Rev. Cameron Randle, an Episcopal priest serving as Rector of St. George’s Parish in Pungoteague on Virginia’s Eastern Shore, invites us to consider some important points when ministering with “those who look different than we look or come from a different perspective culturally than we do or perhaps linguistically.”¹⁹⁷ This statement is calling us to exercise radical hospitality with strangers when taking into account their differences so that we can reach out to all who come to the steps of the church.

It is my experience, that in terms of cultural diversity, the congregants can be Spanish speakers, but that in itself does not mean that when I deliver the sermon, they might fully understand the meaning of the embedded message. In this regard, I am always aware of the context, including the practices and customs, and the particularity of the language and idiomatic expressions that diverse people from various countries might use. In addition to this, I have also come to realize that there are people in the church who cannot speak Spanish, despite their countries of origin, such as Mexico and Guatemala where Spanish is the primary language. The United Nations Educational, Scientific and Cultural Organization (UNESCO) estimates that “30 to 50 million indigenous inhabitants, over 650 indigenous peoples and more than 550 different languages spoken

¹⁹⁶ Justo L. González and Pablo A. Jiménez, *Púlpito: An Introduction to Hispanic Preaching* (Nashville, TN: Abingdon Press, 2005), 61.

¹⁹⁷ Angelica Garcia-Randle, “Latino Ministries - The Episcopal Diocese of Southern Virginia,” <https://vimeo.com/154167567> (accessed September 13, 2017).

in 21 countries, Latin America is one of the most linguistically and culturally diverse areas of the world.”¹⁹⁸ This suggests that in the USA, there are congregants in church communities who fall in this category of being multicultural and multilingual. As a theologian and a preacher, I am sensitive to this concern since the sermons that I prepare and deliver might be quite acceptable in grammatical terms, but I might be inadvertently ignoring a group of people from indigenous origins. Not taking this group of people into account in the sermon preparation could be considered an unintentional sin of indifference.

As churches attempt to navigate with the crisis of low attendance and participation, it seems to me that consideration should be given to the evangelization of all people. In my view, when leaders in the church are mainly concerned about the sustainability and survival of their denominations, they ignore the seed that is present in their communities. Thus, as theologian and as a preacher, I strive to become not just bilingual and multicultural, but a visionary, to see where God is calling me to serve and bring the message of hope, justice and peace.

Being a preacher is a job in progress. There are new methods of communications that need to be learned and applied. This implies that a preacher has to be constantly involved and in touch with other preachers. Seminaries and universities offer classes and short-term workshops where one can benefit from such offering. Above all, preaching should offer a prophetic imagination in which “an alternative to the ways things simply

¹⁹⁸ UNESCO.

“are” and the way in which God “intends” that they should be”¹⁹⁹ are challenged for transformation to take place in people lives and their communities.

Community Leader

The third ministerial competency I selected to develop further is that of Community Leader. To this end, I have adopted a strategy that would allow me to be closer to the community and its leaders. The strategy included participation in community events and the investigation of which community organizations were working on environmental issues so that I could partner with them. In addition, a benchmark was identified and established in which I would develop a working relationship with at least five key leaders in the community. As an aspiring Community Leader, I am eager “to have an impact on the lives” and the quality of people who can benefit from learning about the Water Quality in West Orange, NJ.²⁰⁰

As a recent arrival, becoming known and established as a leader in a new community is not easy. In 2014, I became the priest at Holy Trinity Episcopal Church in West Orange, NJ. At that time, I did not know any leaders in the town. However, having an open mind and a mentality of inclusion has assisted me in getting to know those personalities who are attuned to issues of concern and who know organizational skills to address them in the community. During the West Orange mayoral race in 2014, on a cold Sunday morning, Mr. Rodolfo Rodriguez, and his campaign manager, Rabbi Jerry

¹⁹⁹ Valentino Lassiter, *Martin Luther King in the African American Preaching Tradition* (Cleveland: Pilgrim Press, 2001), 62.

²⁰⁰ Peter Guy Northouse, *Leadership: Theory and Practice*, 7th ed. (Los Angeles: SAGE, 2015), 336.

Altman, came to the doors of Holy Trinity Episcopal Church.²⁰¹ Both gentlemen were looking to speak to the congregants about Mr. Rodriguez's candidacy for the Office of the Mayor. By this time, most of the people had left for the day. I welcomed both gentlemen to have a conversation. After we had spent some time with the small group talking and extending good wishes well for Mr. Rodriguez's election, I ended the meeting with a prayer in which all of us participated.

Surprisingly, months after the mayoral election campaign, Mr. Rodolfo Rodriguez came back to the church to thank us for the welcome that he had received at Holy Trinity Episcopal Church, and he informed us that he had been appointed Deputy Mayor of West Orange, NJ. In addition, Mr. Rodriguez returned again to Holy Trinity, requesting support to form a Hispanic Foundation that he was forming in West Orange. I presented the request to our Executive Committee, which approved Mr. Rodriguez's request for the newly formed organization to meet at our church. Cultivation of the role of a recognized leader means that I must be aware of my role and capacities to be in a position to help others achieve their goals or purpose for the benefit of the community and society in general.²⁰² This creates an environment where a win-win relationship is established.

Deputy Mayor Rodolfo Rodriguez has been instrumental in helping me to become familiar with so many influential people in a short time that I have been serving as a priest at Holy Trinity Episcopal Church in West Orange, NJ. Another key player in my introduction to West Orange leadership has been Mr. Victor Cirilo, council member in

²⁰¹ To read about Mr. Rodriguez's mayoral candidacy, visit: <https://www.tapinto.net/articles/meet-the-mayoral-candidates-rodolfo-rodriguez>.

²⁰² Northouse, *Leadership*, 6.

the Town of West Orange.²⁰³ Mr. Cirilo invited me to speak at the City Council meeting about the Water Quality project on June 11, 2017.²⁰⁴

In my transformative formation into becoming a community leader, to implement the God and Science project on the Water Quality of West Orange, I participated in community events in which I was invited to speak. Other times, I attended events that were held in the community. As an observer, I have learned that when I go to community events, I am introduced to other leaders in the community, and afforded multiple opportunities to network with other people who are concerned about our community on various issues. In addition, I have also benefited from establishing connections and dialogue with organizations that are passionately working on related environmental issues in particular.

Looking at my past connections with people who are concerned about the environment, I was able to reestablish my link with the Rev. Fletcher Harper, the Director of the environmental agency called GreenFaith, and a minister of the Episcopal Diocese of Newark in New Jersey, who has been working on environmental issues for a long time.²⁰⁵ From this relationship, I was introduced to other monitoring environmental groups, such as Rutgers University's Environmental and Occupational Health Sciences Institute (EOHSI). When the door to Rutgers University was opened, I felt that I had gained an important partner for the Water Quality project in West Orange, NJ. This is an example of how worthwhile it is to maintain connections with other people and

²⁰³ To read about Mr. Victor Cirilo, visit: <http://www.westorange.org/index.aspx?NID=202>.

²⁰⁴ See: https://www.youtube.com/watch?time_continue=2&v=tWLMUP9bO6w.

²⁰⁵ Many years ago, at the Newark School of Theology, I was a student in the class "Theology and the Environment" in which the Rev. Fletcher Harper was the instructor.

organizations. At this point, Rutgers University has provided a number of opportunities for me to be educated in the area of environmental concerns. Through a continuous dialogue, I have maintained a close relationship with Rutgers University, and from this cooperation, we had the opportunity to bring a number of students and volunteers to the Rutgers University Environmental laboratory. It was this venue that allowed members of Holy Trinity's God, Science, and Art Summer Program to be introduced to laboratory procedures, as well as be presented with the data results of the Water Quality test analysis done at Holy Trinity Episcopal Church in West Orange, NJ.²⁰⁶

As a result of my continued attendance and correspondence with various organizations that are interested in effective stewardship of the environment, I have become part of a network of people who are well informed about various fora and events on the environment. I have participated in two Green Circles meetings that were organized by GreenFaith.²⁰⁷ This interaction with other group activities provides not just information, but additional strategies for achieving the goal that I have set out: to become a Community Leader whose passion is calling attention to municipal Water Quality in West Orange, NJ, and identifying potential as well as existing sources of contamination so that their effect might be mitigated.

²⁰⁶ On June 12, 2017, a team from Rutgers University's Environmental labs came to Holy Trinity to take water samples for the testing of lead.

²⁰⁷ Greenfaith, "Interfaith Green Circle Forms in Summit," <http://www.greenfaith.org/media/press-clips/interfaith-green-circle-forms-in-summit> (accessed December 23, 2017).

CHAPTER 9

COMMUNITY TRANSFORMATIONAL OUTCOMES

An essential objective of action research is to take into account primarily the varied needs of the affected stakeholders in the community. The renowned professor of Mathematics, Roger Penrose, believes that “it is more important than ever, in today’s technological culture, that scientific questions should not be divorced from their moral implications.”²⁰⁸ His observation also reflects a moral dimension; research should be directed at improving the lot of the affected stakeholders.

In any given research or project implementation, we must take into account the positive and the negative ramifications of the concerns and issues that are driving the investigation of the question at hand, and their effect on the people in the community. It also means that we cannot ignore the findings or facts that are revealed in the process, and we must share the knowledge obtained with the affected members of those communities.

Paulo Freire, in his influential book *Pedagogy of the Oppressed*, indicates that “the starting point for organizing the program content of education or political action must be the present, existential, concrete situation, reflecting the aspiration of the people.”²⁰⁹ In other words, action research has to take into account the current, particular and concrete situation of a given community. Furthermore, according to the liberation

²⁰⁸ Roger Penrose, *The Road to Reality: A Complete Guide to the Laws of the Universe* (New York: Knopf, 2005), 22.

²⁰⁹ Paulo Freire, *Pedagogy of the Oppressed*, 30th ed. (New York: Continuum), 95.

theologian's point of view, action research is "to see social reality from a point of view of departure in the reality of the poor – opts to analyze processes in the interest of the poor, and to act for liberation in concert with the poor."²¹⁰ Thus, the object of action research and project implementation should be to bring about a direct benefit to the people of the community, and who should have an active and credible participatory role as stakeholders in their community.

There is also a sense of a call to duty when attempting to solve problems in our communities. We are responsible, or should be responsible for the care and well-being of the earth, and the universe as a whole. Henry David Thoreau expressed this clearly when he said: "Probably I should not consciously and deliberately forsake my particular calling to do good which society demands of me, to save the universe from annihilation."²¹¹ Thoreau's statement is profoundly overpowering, and at the same time, underscores the point that when we do good in our society, we are indeed influencing some goodness in the universe in general. From the time of the nomadic tribes to the creation of modern societies, substantial evidence has affirmed that for survival, cooperation is necessary. Human beings are endowed with a sense of responsibility to serve one another. In fact, "we wouldn't be around today if our early human ancestors hadn't huddled together to help their fellow tribes people survive."²¹² Serving others is not only a moral responsibility, but is of vital importance for society to survive and to flourish. This is the reason why civil and political organizations and concerned citizens must work

²¹⁰ Leonardo Boff, *Salvation and Liberation* (Maryknoll, NY: Orbis Books, 1984), 48.

²¹¹ Henry David Thoreau, *Walden: And, Civil Disobedience* (Harmondsworth, UK: Penguin Books, 1983), 116.

²¹² Doug Lennick, *Moral Intelligence: Enhancing Business Performance and Leadership Success* (Upper Saddle River, NJ: Wharton School, 2005), 100.

cooperatively to solve common problems in their communities. Similarly, faith communities must “shift the emphasis away from mere orthodoxy, in terms of saying the right thing, toward a much more evangelical imperative of doing the right thing.”²¹³ This is a clear call for action, and to mobilize congregants to pay attention to issues impacting the environment, and Water Quality in particular.

Moreover, our consciousness has been awakened to a new reality in which we should care about the welfare of others. Antonio Damasio, Distinguished Professor, and Head of the Department of Neurology at the University of Iowa College of Medicine, offers a definition of consciousness in which others are at the center: “at its most complex and elaborate level, consciousness helps us develop a concern for other selves and improve the art of life.”²¹⁴ Examining community issues which negatively impact the collective welfare has at its heart the desire to meaningfully help others in the communities in which we live.

In order to instill collective values that can foster an atmosphere in which transformational community outcomes can be accomplished, the public has to be willing to take a stand for what they believe in; this includes affirmatively advocating for the issue of safe Water Quality. This position is supported by Caryl M. Stern, the President and CEO of the United States Fund for UNICEF, who stated that “as a team we were proclaiming our collective dismay at how many thousands of children died each day from diseases like neonatal tetanus or poverty-related conditions such as malnutrition or lack

²¹³ Kortright Davis, *Serving with Power: Reviving the Spirit of Christian Ministry* (New York: Paulist Press, 1999), 83.

²¹⁴ Antonio R. Damasio, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace, 1999), 5.

of access to clean water.”²¹⁵ We need to present the concerns that our communities are facing by putting forward these concerns to the public in general for their information and to encourage them to take action.

In attempting to solve community problems, attention must be paid to the issues impacting a community, and identify the ones that are negatively affecting the members of that community. For the community of West Orange, NJ, the topic of Water Quality was identified as an issue requiring urgent attention as a result of the concerns raised in the investigation of water contamination in Flint, Michigan, and Newark, NJ and therefore became the subject of our project.

Listed below are some of the community concerns raised and some of the lessons learned during the execution of the Water Quality project in West Orange, NJ. It was evident from the data collected in the questionnaires that a high percentage of the participants did not have a clue about the health issues that could result from consuming water with levels of lead high above the prescribed 15 parts per billion (ppb).²¹⁶ This finding is a call for action. To meaningfully rectify this issue which negatively affects their health, the residents of West Orange, NJ, should be educated as to the potential danger of consuming contaminated tap water and provided with countermeasures. The fact that “recent studies have linked maternal lead exposure to fetal death, prenatal growth abnormalities, reduced gestational period, and reduced birth weight” should be publicized on a regular basis.²¹⁷ Similarly, the fact that fetal death and infant mortality

²¹⁵ Caryl M. Stern, *I Believe in Zero: Learning from the World's Children* (New York: St. Martin, 2013), 66.

²¹⁶ The number of samples collected for the Spanish and English questionnaires is small. However, the areas of concerns uncovered could be real and it needs to be examined to be conservative.

²¹⁷ Grossman, “The Effect of an Increase in Lead.”

rates are associated with lead contamination needs to be effectively conveyed to families in the area.²¹⁸

Conclusions drawn from the data obtained in the questionnaires revealed that most participants did not know anything about the subject of water pollution in general, or the health threat of lead contamination, in particular. This means that the residents of West Orange, NJ, and the public in general, need to be fully educated about the potential risks of contaminants in their water supply. The results of this investigation therefore provide an opportunity for the Township of West Orange to begin monitoring the water quality reports provided by the NJ American Water Company, and disseminating the findings on the Town's webpage. The municipal government could also be proactive and engage independent water testing laboratories to test the water so as to verify the accuracy of the Water Quality Reports. Failing to implement such a monitoring regime could potentially result in a catastrophic public health crisis in both the short and long term as we do not know the full extent of the deleterious consequences of continued exposure to lead.

Another revealing concern uncovered in the questionnaires was that a number of Spanish-speaking respondents did not know the construction date of their dwellings, while a larger number of English-speaking respondents indicated a positive response to this question. This disparity indicates that some residents of West Orange, NJ, need to be educated on how to obtain those construction dates, because houses and buildings constructed before 1920 would require regular testing of the water supplied to them for lead contamination.

²¹⁸ Ibid.

The questionnaire responses also revealed that the residents of West Orange, NJ, are greatly concerned about, and interested in the effective stewardship of their environment. They are especially concerned about the possible pollution of their drinking water. As a result, community organizations need to educate the public about contamination issues related to the environment in general, and Water Quality specifically. The public should be instructed to view and examine the alerts on the NJ American Water Company webpage (<https://amwater.com/njaw/alerts>), which are posted in two categories: General and Emergency.

With the universal accessibility of vital information through social media, the public should be educated about how to access their Water Quality Report. As the questionnaires revealed, only a small number of Spanish-speaking participants knew how to access the West Orange, NJ, water report. To educate the Hispanic/Latino groups in the community as to how to access those reports, community organizations should make it a high priority to develop an informational electronic media format targeted to that population, in which the content must be developed and conveyed in Spanish.

Collective progress in the twenty first century requires that all members of society should be consulted, and involved in identifying and solving community problems, such as the contamination of the environment. Children and young adults must be taught to think ecologically and theologically by meaningfully participating in programs like the aforementioned God and Science program that are becoming popular in certain colleges and universities. For example, Rice University offers a Religion and Public Life Program which facilitates “*informed dialogue about religion among scholars, community leaders,*

and members of the public.”²¹⁹ In these types of programs, children and young adults are introduced to the fields of scientific investigation and theological stewardship of the environment. The participants in these programs can learn how science can help in preserving nature, while the theological aspects can inform them about thoughtfully caring for God’s creation. In this way, these young participants can prepare themselves for the future in various careers that would improve people’s lives through better collective management of our natural resources.

Exposing children and young adults to role models can be of great influence as well. Another educational opportunity is offered by The United Nations Educational, Scientific and Cultural Organization (UNESCO) program entitled “Service Learning” which “aims to combine teaching, apprenticeship and reflection by adding to the academic curriculum some sort of community service designed to further the student’s education and at the same time enhance the life of the community.”²²⁰ It is through community involvement that children and young adults can gain educational experience that help them to develop a sense of responsibility for the pressing issues in the community, such as water quality. Educational opportunities can be a gateway to break out of cycles of poverty and provide the pathway to a better future:

Education is self-renewing. Education breaks the cycle of generational ignorance and self-neglect. Education causes self-appraisal and self-improvement. Education enables one to participate in a social contract, to understand the limits of freedom, to appreciate a society of pluralism and openness. Education generates independence and self-reliance and is a contribution to society rather than a drain on it.²²¹

²¹⁹ Rice University, Religion and Public Life Program, <https://rplp.rice.edu/about> (accessed October 24, 2017).

²²⁰ UNESCO.

²²¹ Proctor, *Preaching About Crises*, 87.

As education is vital in offering young people opportunities for improvement, the general public needs to be empowered to exercise their rights. As citizens, they have the right to protect their health. When the environment is contaminated with dangerous pollutants, they have the right and obligation to request the politicians to correct those hazardous and risky conditions. As Gustavo Gutierrez, the Liberation Theologian of Peru, states “those who suffer unjustly have a right to complain and protest. Their cry expresses both their bewilderment and their faith.”²²² In order for transformation to take place in a community, local leaders must get involved in showing solidarity with those who are vulnerable and suffering. Thus, the victims of environmental injustice are enabled to raise their voices about their concerns, and in so doing, become agents of change.

²²² Gustavo Gutiérrez, *On Job: God-Talk and the Suffering of the Innocent* (Maryknoll, NY: Orbis Books, 1987), 101.

CHAPTER 10

THE FUTURE WATER ISSUES AND CONCERNS

As the world population continues to grow, more pressure will be put on water resources. It has been established, in this thesis, that Water Quality and the scarcity of fresh pure water will be a concern in years to come.

In recent months, there have been a number of natural disasters, such as hurricanes, storms, and earthquakes that have afflicted millions of people around the world. Each time one of these disasters occurs, the quality of the water and its distribution are affected.

There is a worldwide awareness of the scarcity of pure water, and the possibility of water contamination has increased in many places. It has already been established that “fresh water is necessary for human survival and for our well-being. In many respects, most of the impacts of climate change are related to water in one way or another”²²³ Floods appear to be increasing; for example, “the 2010 Pakistani floods are the worse ever recorded in that country and one of the world’s worst natural disasters to date.”²²⁴ Floods detrimentally affect the water quality that people use for consumption.

As disasters destroy the natural environment, fresh water sources will be impacted to the point that crops will be lost, and hunger will result for thousands of people. The

²²³ Jim Ball, *Global Warming and the Risen Lord: Christian Discipleship and Climate Change* (Washington, DC: Evangelical Environmental Network, 2010), 102.

²²⁴ Ibid.

most vulnerable will be affected; “for peasants, it means starvation, and destitution as drought wipes their crops. For children, it means dehydration and death.”²²⁵

It seems that the predictions made by global warming environmentalist became a reality when they warned of “the dangers of humanity’s emissions of particle pollutants and greenhouse gasses. [And that] the climate could shift dangerously in the next one hundred years.”²²⁶ With the recent increase of hurricanes, earthquakes, tsunamis, the general public should embrace an attitude in which close attention should be paid to reducing the consumption of chemical and gas emitting products that pollute the earth.

Besides the natural disasters affecting water purity and creating scarcity, there is another peril that is a huge concern for citizens everywhere. Water has become a commodity, and private companies are competing for the “blue” liquid for their businesses. For example, “the American water market for water supply and treatment, estimated at \$90 billion, is the largest in the world, and Vivendi [a French company] is investing heavily in order to dominated it.”²²⁷ Similarly, soft-drink companies like Coca-Cola, Pepsi, and many others are in competition to secure fresh water for their products, including bottled water.

As the price of bottled water experience hikes, the end result maybe a hike in the price of tap water. Why? Because as “global corporations are taking full advantage of the demand for clean water, a demand which has resulted from environmental pollution.”²²⁸

²²⁵ Vandana Shiva, *Water Wars: Privatization, Pollution, and Profit* (Berkeley, CA: North Atlantic Books, 2016), 15.

²²⁶ Spencer R. Weart, *The Discovery of Global Warming* (Cambridge, MA: Harvard University Press, 2003), 71.

²²⁷ Ibid., 98.

²²⁸ Ibid., 101.

People consume bottled water since tap water has been found to be polluted in some cities like Flint, Michigan and Newark, New Jersey. It is estimated that between 1984 and 2005, the consumption of bottled water raised a thousand-fold. The drivers of this increase included: an aging municipal water infrastructure; and a perception that bottled water was safer and tasted better than tap water.²²⁹ However, it has been reported that bottled water is not on par with tap water; for example, “in March 1999, in a study of 103 brands of bottled water, the Natural Resources Defense Council found that bottled water was no safer than tap water.”²³⁰

Another area of concern about private companies providing bottled water is that aquifers could become dry, and fresh water would not be available for local communities. According to an article written by Michael Spoliansky, entitled Water Scarcity and Bottled Water: A Recommendation for Florida’s Water Policy, there are concerns and risks associated with the privatization of the water resources:

Due to the availability of fresh water sources in developed nations, water scarcity issues may not be readily apparent. With the turn of a knob, the faucet reveals a stream of fresh, clean, drinkable water. Despite the relative ease at which water can be accessed in the United States and other developed nations, water is a relatively finite resource and continues to be depleted as the population grows. Only two-and-a-half percent of all of the available water on Earth is available fresh water.²³¹

An additional area of concern about the use of bottled water is the waste created and the associated impact on the environment. Disposing bottled water in the

²²⁹ University of South Carolina, “Walmart’s Sustainability Journey: Bottled Water Mini Case,” https://www.sc.edu/study/colleges_schools/moore/documents/sustainability/bottled_water_mini_case.pdf (accessed October 30, 2017).

²³⁰ Ibid., 100.

²³¹ Michael Spoliansky, “Water Scarcity and Bottled Water: A Recommendation for Florida’s Water Policy,” <https://www2.stetson.edu/advocacy-journal/water-scarcity-and-bottled-water-a-recommendation-for-floridas-water-policy/> (accessed October 31, 2017).

environment water creates pollution; it is estimated that “only 23% of disposable water bottles [are] recycled, and it takes about 700 years for [Polyethylene terephthalate] PET bottles to decompose.”²³² According to a presentation made at Arizona University, when water bottles are not recycled:

- They end up in landfills and oceans
- Harmful chemicals in the bottles can be absorbed by groundwater
- Birds, fish, and other animals can die by consuming plastic debris
- It can take thousands of years for the plastic to decompose
- Some scientists believe the plastic never fully decomposes.²³³

The peril is that chemicals may be deposited and could accumulate over time in water streams; thus, the environment is affected negatively by destroying ecosystems. When water is polluted the most vulnerable people are affected, leaving them without the fresh water needed for life.

Humanity is at the crossroads. There is an alarming concern that climate change is directly contributing to harmful algal blooms in water sources, such as lakes. This is an issue that needs prompt attention because it impacts the water supply of many people. It has been reported that:

Many lakes and estuaries around the world, which provide drinking water for millions of people, and support a myriad of ecosystem services, already have toxic, food web-altering, hypoxia-generating blooms of cyanobacteria. The occurrence is driven by high inputs of nitrogen (N) and phosphorus (P) to the ecosystems from human sources. To reduce the frequency and intensity of noxious and sometimes toxic cyanobacteria blooms, sizable reductions of both N and P are urgently needed. Yet,

²³² Encyclopaedia Britannica Online, s.v. “polyethylene-terephthalate,” <https://www.britannica.com/science/polyethylene-terephthalate> (accessed October 30, 2017).

²³³ Sydney Beke, Brittney Smith, and Annie Mielke, “Filled with Love,” https://courses.eller.arizona.edu/mis/Honors111/reports/SUS03_RPT.pdf (accessed October 30, 2017).

Climate change will severely affect our ability to control blooms, and in some cases could make it near impossible.²³⁴

Cyanobacteria are aquatic and photosynthetic bacteria. They live in water and can manufacture their own food. They are quite small and usually unicellular, and often grow in colonies large enough to be seen. They have the distinction of being the oldest known fossils, more than 3.5 billion years old.²³⁵ “Algal blooms can cause a variety of problems. Blooms causing harm to human or animal health or to the environment are referred to as harmful algal blooms (HABs)” that could affect the liver and the nervous system.²³⁶

It is clear that clean water supplies need to be protected. Governmental agencies, municipalities, and other organizations responsible for monitoring and testing the water supply need to implement measures to ensure that water sources are protected from contamination. In addition, the public needs to be informed when the water supply is compromised. Fresh clean water needs to be available for all living beings. This is crucial for the survival of the planet.

²³⁴ Karl E. Havens, and Hans W. Paerl, “Climate Change at a Crossroad for Control of Harmful Algal Blooms,” *Environmental Science and Technology*, <http://pubs.acs.org/doi/pdfplus/10.1021/acs.est.5b03990> (accessed October 31, 2017).

²³⁵ University of California at Berkeley, “Introduction to the Cyanobacteria Architects of Earth’s Atmosphere,” <http://www.ucmp.berkeley.edu/bacteria/cyanointro.html> (accessed October 31, 2017).

²³⁶ Jennifer M. DeBruyn, “Cyanobacteria (Blue-Green Algae) Harmful Algal Blooms,” <https://extension.tennessee.edu/publications/Documents/W340.pdf> (accessed October 31, 2017).

APPENDICES

APPENDIX A –DEMONSTRATION PROJECT PROPOSAL

GOD AND SCIENCE: THE EFFECT OF WATER QUALITY ON THE
HEALTH AND WELLBEING OF THE COMMUNITY OF WEST ORANGE,
NEW JERSEY

By
MIGUEL A. HERNANDEZ

DEMONSTRATION PROJECT PROPOSAL

New York Theological Seminary

November 14, 2016

Challenge Statement

As a Priest of a 109-year-old church, Holy Trinity Episcopal Church in West Orange, NJ, and as a community advocate, I have concerns as reports indicate that the water quality in some surrounding towns has been compromised, as tests have revealed high levels of lead in the water, making it unfit to drink. If this issue is not addressed, people in the community will most likely become ill. The demonstration project will create a public awareness campaign that will seek to educate the members of the church and the community at large about the possibility of unsafe water quality in West Orange and to encourage the development of sustainable solutions.

Table of Contents

CHAPTER 1 INTRODUCTION TO THE SETTING	1
CHAPTER 2 PRELIMINARY ANALYSIS OF THE CHALLENGE	7
CHAPTER 3 PLAN OF IMPLEMENTATION	10
CHAPTER 5 EVALUATION PROCESS	14
CHAPTER 6 MINISTERIAL COMPETENCIES.....	16
APPENDICES	21
APPENDIX A: TIMELINE	22
APPENDIX B: BUDGET	24
BIBLIOGRAPHY	26

CHAPTER 1 INTRODUCTION TO THE SETTING

Holy Trinity Episcopal Church in West Orange, New Jersey, was established in 1907. Located in a working class neighborhood, Holy Trinity was a predominantly White congregation when it was opened. Over the past 15 years, Holy Trinity has become a more diverse congregation that includes Whites, Blacks, West Indians, Africans (from Africa) and Hispanics. One Afro-American family joined Holy Trinity over 32 years ago. This indicates that Holy Trinity was opened to become a multi-racial and multi-cultural congregation.

As expected, many of the priests in the early days were White males. However, as time went on, several of priests have been Black, Filipino, Indian (from India) and Hispanic. In addition, women have served the congregation as priests. During the past five years, the church has been under financial distress, which did not allow it to have a full-time priest. In the previous three and half years before I came to Holy Trinity, the church was led by the lay leaders, with supply priests being recruited to officiate at the weekly church services. As a result, the parishioners did not receive the pastoral care needed for their spiritual well-being. I became the Priest-in-Charge of Holy Trinity in March 2014.

Historically, Holy Trinity is of the Anglo-Catholic tradition and part of the worldwide Anglican communion. This is reflected in the form of its worship services, which start with an acclamation and the Collect for Purity based on Psalm 51. The

prescribed lessons as indicated in the common lectionary are read as follows: A reading from the Old Testament (Hebrew Bible), a reading from Psalms, a reading of an Epistle, and a reading from the Gospel.¹ Note that the lectionary uses a three-year cycle to allow for a focus on a different Gospel reading: Year A for Matthew, B for Mark and C for Luke. However, the Gospel according to John is used at different times throughout the three years.

The Sermon is delivered following the completion of the prescribed readings. The Prayers of the People and the General Confession are then offered. The Peace is exchanged and after this, the Eucharist, or Holy Communion is offered. At Communion, we consume the broken bread and share the one cup as a sign of unity in faith and taking our place in the one Body of Christ, the fellowship of all believers. This format of the service is performed every time we come together to celebrate the Mass or the Eucharist. The priest is the spiritual leader during the service. However, when no ordained minister is present, a lay leader can perform the service using the rituals found in the Book of Common Prayer (BCP) for a given occasion.²

The Cross is the main religious symbol at Holy Trinity. The Cross, which reminds us of Jesus' sacrifice for us, proceeds all processions in the church.³ The Bread and the Wine are the two other important symbols in the Eucharist representing the Body and

¹The readings in the lectionary can be found at <http://www.lectionarypage.net/CalndrsIndexes/Calendar2016.html>.

² Church Publishing, *Book of Common Prayer Chapel Edition: Red Hardcover* (Unknown: CHURCH PUBLISHING INC, 1979).

³ *Basic Catechism*, 6th ed. (Boston, MA: Daughters of St. Paul, 1987), 103.

Blood of Christ. In the Eucharist, we are reminded that Jesus wants our company as guests at his supper.⁴

The members of Holy Trinity are committed Christians who believe in sharing their resources with others. Theologically, they believe in the resurrected Jesus and the power of the Holy Spirit. I have observed that when preaching about the sacrifice of Jesus on the Cross, congregants tend to accept the message more readily than when the message has to do with economic or social issues in the world.

Holy Trinity serves the community through its various ministries: The Food Bank, the Soup Kitchen, the Thrift Shop, the Tutoring Center, and the God and Science Summer Program. Holy Trinity supports over 150 people per week in the above-mentioned ministries. People from the community come during the week to pick up non-perishable food and on Saturdays people come to receive a hot meal for lunch. At the Thrift Shop, people come to buy items that are in great shape for a fraction of the regular price. During the winter, there is a coat drive in which coats are sold cheaply. These ministries are mostly organized and run by volunteers under the guidance of the Priest-in-Charge and the Executive Committee of the Church. In addition, Holy Trinity offers its dining hall space for outside organizations such as Alcoholics Anonymous (AA) meetings three times a week, and the West Orange Hispanic Foundations (WOHF), which meets once a month.

The membership of Holy Trinity is very small, around 30-40 people attend the Sunday English language service at 9:30 a.m.; and between 12-23 people at the 12:30 p.m. Spanish language service. In terms of demography, most of the members of Holy

⁴ Rowan Williams, *Being Christian: Baptism, Bible, Eucharist, Prayer* (Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 2014), 41.

Trinity are Afro-Caribbean and a few Anglo families. The ages of the parishioners range from 0 to 83 years old. There are about 16 children ranging in ages from 9 to 18 years old. However, most of the parishioners are over 60 years of age. The income-level of the congregants falls within the category of middle class. In my estimation, the congregants are middle-income earners in the range of \$30,000.00 to \$70,000.00 (USD). There are a few members who have fixed income as they are retirees.

The organizational structure of Holy Trinity is as follows: there are a Priest-in-Charge and an Executive committee responsible for the day-to-day functioning of the church, including making payments to institutions and employees. The Priest-in-Charge is responsible for the spiritual well-being of church members and the liturgical planning during the church year. Under the Priest-in-Charge, there is a Deacon who has a leadership role that covers multiple functions, such as liturgical planning, assisting in religious services, preaching and visiting homebound parishioners.

The members of Holy Trinity are very supportive of this God and Science Program. Currently, three members from the congregation have accepted the challenge and opportunity to be part of the Site Team for the project, and as we continue to talk about the possibilities of the project, they have offered ideas as to how to move the project forward.

All persons participating in the research are to be considered as contributors and stakeholders in the planning and conduct of the research, as well as beneficiaries of the research outcome.

Selecting the appropriate site participants for this research Program is an important aspect of conducting the research within the community setting. This indicates

that I will have to engage people in order to persuade them to participate in the research and the project. To achieve this, I will have to talk to people in places that are not intimidating to them such as coffee shops, libraries, restaurants, in the street and other places where they can feel free to express themselves.⁵

In my role as an action researcher, I have to make sure that good relationships are developed and encouraged; ensure that participants work in a harmonious fashion; offer the space for participants to become co-researchers and so help to plan and guide the project; engage participants to freely speak their minds; celebrate achievements; and request inputs from all participants during all stages of the research and execution of the project.

Another lesson that I learned from Stinger's experience is to pay close attention to the planning of the research process.⁶

These are some of the main points that can be considered as an outline for the research planning: relationships, history, people, groups, problems, and resources.⁷ Under each of the categories to be considered for the research, sample questions will be asked to gather information and delve into the setting. For example, who are the people whose relationships are important? When was the community established? What is the makeup of the community? The message that comes home to me is that when doing research, I need to formulate questions at various stages of the research and execution of the project. Questions can open up pathways to areas that otherwise would remain untapped if they are not formulated and asked.

⁵ Ibid., 84.

⁶ Stringer, Ernest T. (2013-06-20). *Action Research* (p. 230). SAGE Publications. Kindle Edition.

⁷ Ibid., 86-88.

Finally, when conducting research, “Ethical procedures are an important part of all research”.⁸ In this regard, I have to be responsible for the participants and show a “duty of care” for them. The participants are to be considered valuable contributors and owners of the research. Thus, respect and dignity have to be the code of conduct from me as a researcher. To make sure that participants are aware of the way in which their contributions will be used, a written form of consent will be given to them accompanied with a detailed explanation of what this entails.⁹

⁸Ibid., 88.

⁹Ibid., 89.

CHAPTER 2

PRELIMINARY ANALYSIS OF THE CHALLENGE

As a Priest of a 109-year-old church, Holy Trinity Episcopal Church in West Orange, NJ, and as a community advocate, I have concerns as reports indicate that the water quality in some surrounding towns has been compromised, as tests have revealed high levels of lead in the water, making it unfit to drink. If this issue is not addressed, people in the community will most likely become ill. The demonstration project will create a public awareness campaign that will seek to educate the members of the church and the community at large about the possibility of unsafe water quality in West Orange and to encourage the development of sustainable solutions.

Ecological disasters are threatening human existence and nature in general. To help minimize the effects of this looming catastrophe, the God and Science project will strive to educate young people about God's creation story and the necessity of taking action to mitigate the impact of those ecological disasters in our communities.

The ecological topic was selected since it is one of the most pressing issues facing every community at this time.¹⁰ It is well known that water and air pollution are detrimental to people's health. Children and young people are very vulnerable when exposed to high-levels of pollutants.

Historically, humanity has been using the resources of nature to fulfill its physical needs for shelter, food, water and other staples for survival and to perpetuate its existence over the centuries. As the world's population has grown, reaching some seven billion, more and more resources are needed to maintain the level of production of goods and services to provide for this growing population. As a result, natural resources are being

¹⁰ Paul Collins' book *Judgment Day: The Struggle for Life On Earth* (Maryknoll, NY: Orbis Books, 2010) is a good reference to learn about the state of the ecological crisis in the world.

depleted. When new products are made available and technological advances are discovered, the environment pays a price in the numbers and level of pollutants that are produced and released into the atmosphere and into the water streams around the world. In the production of food, for example, chemicals are used in the fertilizers and pesticides, which in turn contaminate the ground water supply causing health issues to all living creatures.

As a result of this constant pollution of the earth that is taking place, there is an urgency to address the issue of ecological and environmental contamination and the destruction of the natural resources worldwide. The problem is global as well as local. West Orange, NJ, can benefit by learning about what is happening to the water quality in its own community. The main point, here, is to create an awareness of the pollutants that are directly affecting the health of people.

In the Genesis story, humanity is given charge of the natural world. In a poetic and metaphorical form, man and woman are given the challenge and opportunity to till the land (Gen. 2: 15). In other words, to take care of the natural resources that were placed at their disposal. This implies that the man and the woman in the garden were to work together to care and protect the endowment that was given to them so that future generations could enjoy the paradise that was originally created, free of contamination.

Caring for the ecology and the environment has social, political, economic, and spiritual dimensions. We all live in societies. When our society consumes products, we become part of the problem of polluting the earth. Every time we buy something, waste is produced. Landfills are becoming so large that new industries are generated, such as waste management to deal with it. The creation of jobs helps the economy to some

extent. Politicians most likely support the creation of these new kinds of jobs. However, the number of chemicals used in the production of any product, from textiles to computer products, generates a large number of by-products that are detrimental to the health of people and negatively impact the environment. The destruction of the environment also has a spiritual consequence. When people become ill, they might wonder why they have become ill. Depending on the person, one might think that he or she has sinned against God and that this is the reason for the illness. In other words, punishment is the payment for sin. From this point of view, the person suffers spiritually.

As has been presented in this analysis, the ecological and environmental decay in our society has multiple consequences that need to be addressed. The God and Science project aims at creating awareness as what is happening to our environment and especially to the drinking water in the area of West Orange, NJ.

The outcomes of the God and Science project includes awareness of the current situation in terms of water contamination and how to address some of this issue. The God and Science project will work with local agencies to create space to have meetings to present and discuss the findings of the research, and to share the data with others so that they can become informed citizens.

CHAPTER 3 PLAN OF IMPLEMENTATION

Goals and Strategies

Goal 1: To bring awareness to Holy Trinity Episcopal Church of the potential dangers of chemicals and pollutants that are possibly contained in the drinking water of West Orange in New Jersey.

- **Strategy 1:** Develop a sermon series.
- **Strategy 2:** Speak at three community events.
- **Strategy 3:** Analyze the answers to the questionnaires.

Evaluation of Goal 1: Success will be measured by the number of people who attend the events. At least 25 per cent of the attendees will be asked to fill out two questionnaires, one before the event and one after the presentation, about their awareness of the quality of water.

Goal 2: Build a team of six people to formulate a strategic plan for studying and analyzing the water quality in West Orange.

- **Strategy 1:** Develop criteria and skillset to select people for the team.
- **Strategy 2:** Organize an orientation session for the team.

Evaluation of Goal 2: Recruitment of four team members. Fifty per cent of the team members are to be young people.

Goal 3: The team will develop a campaign to inform the community about the water quality in West Orange, N.J.

- **Strategy 1:** Select media to disseminate the findings of the research.
- **Strategy 2:** Develop materials such as flyers, hand-outs and media clips.
- **Strategy 3:** Identify venues where the project can be implemented.

Evaluation of Goal 3: Seventy-five per cent of the media development should be implemented before the demonstration project is launched.

CHAPTER 4 RESEARCH QUESTIONS

Historical

What is the influence of water in the life of communities?

Water, over the history of humanity, has been important in sustaining life and civilization. Communities were formed along rivers and lakes and near the sea. Since the development of agriculture, irrigation has become a key component in many societies. With the population growth reaching about 9 billion around the world, water is becoming even more critical in sustaining life as the demand for pure water to produce food and other goods is increasing at an alarming pace.

Biblical - Theological

What is the comparison of the water passage in Exodus 17: 1-5 and the living water passage in John 4:7 -14 that can move us into a creation theology?

The biblical passages, Exodus 17: 1-5 and John 4:7 -14, can be examined to gain some knowledge about the importance of water in ancient times. The understanding gained from the analysis of these two biblical passages will be instrumental in the development of a creation theology in which nature is considered the center of the universe for the well-being all created beings.

Socio-Economic

What are the factors that influence how a community's water is serviced and what the people of West Orange, NJ, need to know?

It is a known fact that some towns in the USA, such as Flint in Detroit, have been affected by political and economic policies that have affected negatively some poor communities' water quality; the water quality has been deemed unsafe due to

contamination. An understanding of the issues related to water quality is important for the people in communities that are at risk. Testing the water quality in disadvantaged communities is becoming crucial in order to make sure that the health of the people is protected.

CHAPTER 5 EVALUATION PROCESS

An evaluation process will be implemented during the execution of the God and Science project. The evaluation process will serve as a tool to measure the progress of the ministerial competencies and the project itself. Thus, the evaluation process will determine the progress and potential realization of the God and Science project.

Site Team members will be invited to participate in the formulation and verification of the evaluation process. The Site Team will help in guiding the evaluation process since they will be intimately involved in monitoring the progress and execution of the goals, as well as the strategies to be achieved for the project.

The God and Science project will address the issue of water quality in West Orange, N.J. To implement this project, water quality records of West Orange will be researched. This implies that the records exist and are accessible to the public. Once these records are obtained, their results will be compared against the Federal Standards. A comparison will be made for discrepancies, and the finding will be tabulated. In addition, independent analysis of the water quality will be made. The independent results of the water quality analysis will be compared with West Orange's results and Federal Standards. The findings of the comparison made against West Orange and Federal Standards will be published. This is the technical aspect of the water quality testing and reporting. The evaluation process will make sure that no mistakes or misunderstandings are introduced while collecting and processing the data on the water quality.

A battery of questions will be made in order to find out the awareness that the people in West Orange, N.J. have in terms of the quality of the water they consume. The survey will be designed with the help of professionals in the field in order to develop the appropriate questions to address the water quality in West Orange. The sample of the population for the survey will be targeted at 100. This is a small sample, but it should provide an indication of what the people know about their water quality. The evaluation process, in this case, will make sure that the appropriate tools are used to calculate the statistical results. Tools like the Excel software program will be applied to make the calculations and graph the results. At least one-third of the Site Team members should be present during the evaluation of the God and Science project in order to witness that the researcher has demonstrated a significant achievement of the goals and strategies set for the improvement of the ministerial competencies and the execution of the project.

It is important that the evaluation process includes a checklist for verifying that the project stays on track and that the appropriate funds are obtained and allocated so that the God and Science project is successful.

CHAPTER 6 MINISTERIAL COMPETENCIES

The Process

The Site Team members convened numerous times and worked on the ministerial competencies of the Rev. Miguel A. Hernandez's assessment. Areas of competencies are presented below accompanied by their *Qualifying Words: Continue, Develop, Attention, Start, Skip, No Basis*.

Theologian

Qualifying word: Continue

Comments or observations: Father Miguel reads widely. He has obtained a Masters of Divinity and Masters in Sacred Theology. He combines informal study with his formal study. He is interested in Liberation Theology. He works to develop his own theology (point of view) as he continues to read, study and reflect on scripture.

Preacher

Qualifying word: Develop

Comments or observations: He has a good spirit. He has the challenge of preparing and presenting sermons in both English and Spanish, and making them both effective. His sermons in English are affected by his accent. He strives to draw a link between the readings from the Old Testament, New Testament and Psalms.

Worship Leader

Qualifying word: Develop

Comments or observations: Since Father Miguel has been ordained only two years, he is still gaining confidence in leading the service. More competency could be developed in regards to English pronunciation and cadence, and in regards to advance preparation for special services.

Prophetic Agent

Qualifying word: Continue

Comments or observations: Father Miguel is very attuned to issues of social justice, and frequently preaches on this topic. He brings the perspective of ‘gospel as revolution’ to his theology. He is sometimes invited to speak at events; for example, he was invited to speak at a vigil in West Orange for the victims of the Orlando shooting. He has participated on numerous occasions in rallies related to social justice.

Leader

Qualifying word: Continue

Comments or observations: Father Miguel has taken positive steps in running Holy Trinity, in terms of taking initiative, delegating and managing staffing. He is willing to learn from others, and is a team player. He also steps in when needed to solve problems, as evidenced by his leadership when the hosting group for the weekly soup kitchen failed to show up, and Father Miguel took charge and organized a lunch on short notice. He frequently participates in the thrift shop, and his presence provides reassurance to the volunteers. He also participates in the Commission on Latino Ministry, and is able to persuade others and move the agenda. He has many ideas for what Holy Trinity could be in the future.

Religious Educator

Qualifying word: Develop

Comments or observations: Father Miguel teaches courses at the Newark School of Theology, and teaches Spanish at the General Theological Seminary. He teaches ESL classes to the community, and a “God, Science and Art” program in the summer to young people. His role as religious educator at Holy Trinity has been less prominent, as regards for example participating in Sunday School, or running Bible Study or other classes for adults.

Counselor

Qualifying word: Continue

Comments or observations: Father Miguel is a good listener. He is in huge demand by AA groups for him to speak. He has helped many individuals through his advising. He runs a Healing Service each month. He is very patient and approachable in his pastoral visits. He visits people who are homebound or in the hospital, even beyond congregants from Holy Trinity: he supplies pastoral care to community members in West Orange and to a congregation in Paterson.

Pastor

Qualifying word: Continue

Comments or observations: See ‘Counselor’, ‘Leader’, ‘Worship Leader’ above.

Spiritual Leader

Qualifying word: Develop

Comments or observations: Father Miguel has studied *Lectio Divina*, and meditates. He might look for more ways to share his spiritual practices with the congregants at Holy Trinity, or encourage others to expand their spiritual practices.

Ecumenist

Qualifying word: Develop

Comments or observations: When he teaches at the Newark School of Theology, he addresses people of different religious perspective. He participates in public events in the context of community and national interest with people of all backgrounds. The soup kitchen is hosted by Christian congregations of many denominations, by Jewish groups and by Muslim groups. Father Miguel's planned project involves outreach to the community as a whole.

Witness or Evangelist

Qualifying word: Continue

Comments or observations: Father Miguel started a Sunday afternoon service in Spanish, and has been extremely diligent in giving his time and attention to supporting it. He has reached out to the community to encourage neighborhood children to join the summer "God, Science and Art" program for young people. He goes out and strikes up conversations with people in the parks, the streets and restaurants. He has partnered with the newly-formed West Orange Hispanic Foundation, which meets at Holy Trinity.

Administrator

Qualifying word: Continue

Comments or observations: Father Miguel is very detailed and meticulous. He has been forceful and effective in negotiating with the Diocese for critically-needed funding, such as for tree removal and roof repairs. He has been effective in solving parish problems, such as replacing the organist and parish administrator.

Professional

Qualifying word: Continue

Comments or observations: Father Miguel is talented at working with people and negotiating conflicts. He brings professional skills from his private sector experience.

Competencies Chosen for Development

I) THEOLOGIAN: Engage in biblical and theological reflection and discussions.

Strategies:

I will read theological themes about the environment.

I will attend theological lectures on the environment.

Evaluation: Catalog themes that will guide my theological thinking about environmental theology.

II) PREACHER: Write sermons that will convey the message about caring about the ecology and inspire hearers to think critically about the environment.

Strategies:

A) Write a three sermon series.

B) Record one of the sermons.

Evaluation: Request project team to write an evaluation of one of the sermons.

III) COMMUNITY LEADER:

Strategies:

I will participate in community events.

I will investigate which are the community organizations that are working environmental issues to partner with them.

Evaluation: Develop a working relationship with at least 5 leaders in the community.

APPENDICES

Appendix A: Timeline

Date	Task/Activity	Person Responsible	Completion Date
7/2016	Submit Draft Proposal	MAH	
9/11/2016	Meet with Site Team	MAH/Site Team	Done
10/2016	Attend one week seminar	MAH	Done
10/2016	Submit Final Draft of Proposal	MAH	
10/2016	Submission of Competencies	Site Team	
11/2016	Recruit Project Team	MAH/Project Team	
12/2016	Develop Goal 1 and Strategies	MAH/Project Team	
1/2017	Develop Goal 2 and Strategies	MAH/Project Team	
2/2017	Develop Goal 3 and Strategies	MAH/Project Team	
3/2017	Teleconference with Advisor to review Goals	MAH/ Advisor	
4/2017	Project Development	MAH	
5/2017	Schedule Awareness Campaign	MAH/Project Team	
6/2017	Roll-Out Presentation 1	MAH/Project Team	
7/2017	Writing Dissertation	MAH	
8/2017		MAH	
9/2017	Schedule Awareness Campaign	MAH/Project Team	
10/2017	Roll-Out Presentation 2	MAH/Project Team	
11/2017	Continue Research and Writing Dissertation	MAH	

Date	Task/Activity	Person Responsible	Completion Date
12/2017	Roll-Out Presentation 3	MAH/Project Team	
1/2018	Complete DP	MAH	
2/2018	Write Conclusions of DP	MAH	
3/20/18	Final Editing of Dissertation	Editor	
4/20/18	DP Presentation / Dissertation Defense	MAH/NYTS	

Appendix B: Budget

Date	Task/Activity	Person Responsible	Materials	Budget / Cost
9/11/2016	Meeting with Site Team	MAH	Copies	\$16.00
10/2016	Attend one week seminar	MAH	Travel	200.00
10/2016	Submit Final Draft of Proposal	MAH	Copies	100.00
10/2016	Submission of Competencies	Site Team	Copies	30.00
11/2016	Recruit Project Team	MAH/Project Team	Meals/Refreshments	100.00
12/2016	Develop Goal 1	MAH/Project Team	Meals/Refreshments	50.00
1/2017	Develop Goal 2	MAH/Project Team	Refreshments	50.00
2/2017	Develop Goal 3	MAH/Project Team	Meals/Refreshments	50.00
3/2017	Teleconference with Advisor to review Goals	MAH/ Advisor	Travel	100.00
4/2017	Project Development	MAH	Test Material	300.00
5/2017	Schedule Awareness Campaign	MAH/Project Team	Paper/ Copies	25.00
6/2017	Roll-Out Presentation 1	MAH/Project Team	Copies/Travel/Meals	100.00
7/2017	Sort Out Documentation 1	MAH	Paper/ Copies	30.00
8/2017	Retreat	MAH	Travel/Meal/Materials	200.00
9/2017	Schedule Awareness Campaign	MAH/Project Team	Copies/Travel/Meals	50.00
10/2017	Roll-Out Presentation2	MAH/Project Team	Copies/Travel/Meals	100.00
11/2017	Sort Out Documentation	MAH	Paper/ Copies	30.00

	2			
12/2017	Roll-Out Presentation 3	MAH/Project Team	Copies/Travel/Meal s	100.00
1/2018	Complete DP	MAH	Copies/Meals	50.00
2/2018	Write Conclusions of DP	MAH	Copies/Meals	100.00

Bibliography

- Adeniyi, Michael Adewale. *Effective Leadership Management: An Integration of Styles, Skills and Character for Today's Ceos*. Bloomington, IN: AuthorHouse, 2007.
- Aldaya, Maite M., and A. Y. Hoekstra. "The Water Needed for Italians to Eat Pasta and Pizza." *Agricultural Systems* 103, no. 6 (2010): 351–60.
- Aldaya, Maite M., Pedro Martinez-Santos, et al. "Incorporating the Water Footprint and Virtual Water into Policy: Reflections from the Mancha Occidental Region, Spain." *Water Resource Management* 24 (2010): 941–58.
- Alfonso, L., Madarang, K., Lee, M., Lee, D., Paule, M., Lee, C., and Kang, J. "Wet weather discharge characteristics of phosphorus and management implications in a mixed land-use watershed." *Desalination and Water Treatment* (2014): 3054–3065.
- Alvarez-Palau, Eduard J. "Infrastructure finance in Europe: insights into the history of water, transport, and telecommunications." *Economic History Review* 69, no. 4 (November 2016): 1398–1399. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Antoniou, G.; Kathijotes, N.; Spyridakis, D.S.; Angelakis, A.N., "Historical development of technologies for water resources management and rainwater harvesting in the Hellenic civilizations," *International Journal of Water Resources Development*. Vol. 30 Issue 4, (December 2014): 680–693.
- Augustine. *Penguin Classics*. Translated by R S. Pine-Coffin. *Confessions*. Harmondsworth, Middlesex, England: Penguin Books, 1961.
- Alter, Robert. *The Five Books of Moses: A Translation with Commentary*. New York: W.W. Norton & Co., 2008.
- Altizer, Thomas J. J., and William Hamilton. *Radical Theology and the Death of God*. Softcover ed. New York: Bobbs-Merrill Company, 1966.
- Appiah, Anthony, and Henry Louis Gates, eds. *Identities*. Chicago: University of Chicago Press, 1995.
- Arenillas, Miguel. "A Brief History of Water Projects in Aragon." *International Journal Of Water Resources Development* 23, no. 1 (March 2007): 189–204. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Aronson, Elliot. *The Social Animal*. 5th ed. *A Series of Books in Psychology*. New York: W.H. Freeman, 1988.

- Arthur, Paige. *Unfinished projects: decolonization and the philosophy of Jean-Paul Sartre*. London: Verso, 2010.
- Basic Catechism. 7th ed. Boston, MA: Pauline Books & Media, 1999.
- Bach, P., McCarthy, D., and Deletic, A. "Redefining the stormwater first flush phenomenon." *Water Research* (2010): 487-2498.
- Bai, S. and Li, J. (2012). "Sediment Wash-Off from an Impervious Urban Land Surface." *Journal of Hydrologic Engineering* (2012): 488-498.
- Balazs, Carolina Laurie. "Water? Social Disparities and Drinking Water Quality in California's San Joaquin Valley." Ph.D. diss., University of California, Berkeley, 2011.
- Ball, Jim. *Global Warming and the Risen Lord: Christian Discipleship and Climate Change*. Washington, D.C.: Evangelical Environmental Network, 2010.
- Bassham, Gregory, and Eric Bronson, eds. *Popular culture and philosophy*. Vol. 5, *The Lord of the rings and philosophy: one book to rule them all*. Chicago: Open Court, 2003.
- Baum, Rachel, Jamie Bartram, and Steve Hrudehy. "The Flint Water Crisis Confirms That U.S. Drinking Water Needs Improved Risk Management." *Environmental Science & Technology* 50, no. 11 (June 7, 2016): 5436-5437. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Bellamy, Richard. *Liberalism and modern society: a historical argument*. University Park, Pa.: Pennsylvania State University Press, 1992.
- Bellinger, Edward G., and David C. Sigeo. *Freshwater Algae: Identification and Use as Bioindicators*. Chichester, West Sussex, UK: Wiley-Blackwell, 2010.
- Bennis, Warren G., and Burt Nanus. *Leaders: The Strategies for Taking Charge*. Perennial Library. New York: Harper & Row, 1986, 1985.
- Berry, R J., ed. *Environmental Stewardship: Critical Perspectives, Past and Present*. London: T & T Clark, 2006.
- Bert, Ray. "London: Water and the Making of the Modern City/Empire of Water: An Environmental and Political History of the New York City Water Supply." *Civil Engineering (08857024)* 83, no. 6 (June 2013): 82-83. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Bian, B. and Cheng, X. Quality Characterization and Impact Assessment of Urban Runoff in a Medium Size City of China. 2011 5th International Conference on Bioinformatics and Biomedical Engineering (2011): 1-5.

- Black, Maggie, and Jannet King. *The Atlas of Water: Mapping the World's Most Critical Resource*. 2nd ed. Berkeley: University of California Press, 2009.
- Bonhoeffer, Dietrich. *Ethics*. touchstone ed. New York: Simon & Schuster, 1995.
- Booth, Wayne C., Gregory G. Colomb, and Joseph M. Williams. *The Craft of Research. Chicago Guides to Writing, Editing, and Publishing*. Chicago: University of Chicago Press, 1995.
- Botha, J Eugene. *Supplements to Novum Testamentum*, Vol. 65, *Jesus and the Samaritan Woman: a Speech Act Reading of John 4:1-42*. Leiden: E.J. Brill, 1991.
- Brady, Judith Ann. *A place at the table: justice for the poor in a land of plenty*. New London, CT: Twenty-Third Pub., 2008.
- Brown, Robert McAfee. *Liberation Theology: An Introductory Guide*. Louisville, Ky.: Westminster/John Knox Press, 1993.
- Brueggemann, Walter. *Theology of the Old Testament with CD-ROM: testimony, dispute, advocacy*. pbk. ed. Minneapolis: Fortress Press, 2005.
- Bunyan, John. *The pilgrim's progress: from this world to that which is to come, delivered under the similitude of a dream*. Hendrickson Christian classics. Peabody, Mass.: Hendrickson Publishers, 2004.
- Campano, Gerald. *Immigrant students and literacy: reading, writing, and remembering*. Practitioner inquiry series. New York: Teachers College Press, 2007.
- California Department of Water Resources. <http://www.water.ca.gov/> (accessed November 7, 2016).
- Chapman, Deborah V., ed. *Water Quality Assessments: A Guide to the Use of Biota, Sediments, and Water in Environmental Monitoring*. 2nd ed. London: E & FN Spon, 1996.
- Cech, Thomas V. "Historical Perspective of Water Use and Development." Chapter 1 in *Principles of Water Resources: History, Development, Management, and Policy*. Wiley, 2002.
- Chebbo, G., Gromaire, M., Ahyerre, M., and Garnaud, S. (2001). "Production and transport of urban wet weather pollution in combined sewer systems: the "Marais" experimental urban catchment in Paris." *Urban Water* (2001): 3-15.
- Choi, J., Maniquiz-Redillas, M., Lee, S., Mercado, J., and Kim, L. "Application of a gravel wetland system for treatment of parking lot runoff." *Desalination and Water Treatment* (2013): 4129-4137.

- Chow, M. and Yusop, Z. "Sizing first flush pollutant loading of stormwater runoff in tropical urban catchments." *Environmental Earth Sciences* (2014): 4047-4058.
- Chow, M., Yusop, Z., and Shirazi, S. "Storm runoff quality and pollutant loading from commercial, residential, and industrial catchments in the tropic." *Environmental Monitoring and Assessment* (2013): 8321-8331.
- Clarke, Robin. *Water: The International Crisis*. Cambridge, Mass.: MIT Press, 1993.
- Cliver, Dean O., Morris Potter, and Hans P. Riemann, eds. *Foodborne Infections and Intoxications, Third Edition (Food Science and Technology)*. 3 ed. Amsterdam, Netherlands, Burlington: Academic Press, 2005.
- Collins, Paul. *Judgment Day: The Struggle for Life On Earth*. Maryknoll, NY: Orbis Books, 2010.
- Cotruvo, Joseph A. "Potable water reuse history and a new framework for decision making." *International Journal Of Water Resources Development* 32, no. 4 (July 2016): 503-513. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Dalby, Simon. *Security and environmental change*. Cambridge, UK: Polity, 2009.
- Davis, B. and Birch, G. (2010). "Comparison of heavy metal loads in stormwater runoff from major and minor urban roads using pollutant yield rating curves." *Environmental Pollution* (2010): 2541-2545.
- Davis, Mackenzie L., and David A. Cornwell. "Water Treatment." Chapter 4 in *Introduction to Environmental Engineering*. 4th ed. McGraw Hill, 2006.
- De Pree, Max. *Leadership Jazz: The Essential Elements of a Great Leader*. Rev. ed. New York: Doubleday, 2008.
- Dean, C., Sansalone, J., Cartledge, F., and Pardue, J. "Influence of Hydrology on Rainfall-Runoff Metal Element Speciation." *Journal of Environmental Engineering* (2005): 632-642.
- Deletic, A. and Maksimovic, C. "Evaluation of Water Quality Factors in Storm Runoff from Paved Areas." *Journal of Environmental Engineering* (1998). 869-879.
- Deng, Z., Sun, S., and Gang, D. "Modeling nitrate-nitrogen removal process in first-flush reactor for stormwater treatment." *Bioprocess and Biosystems Engineering* (1998): 865-874.
- Diamond, Harvey. *Fit for life: a new beginning: your complete diet and health plan for the millennium*. New York, NY: Kensington Books, 2000.

- Diamond, Jared M. *Guns, germs, and steel: the fates of human societies*. Book club kit. New York: W.W. Norton & Co., 1997.
- Ding, H. and Ji, H. "Application of chemometric methods to analyze the distribution and chemical fraction patterns of metals in sediment from a metropolitan river." *Environmental Earth Sciences* (2009): 641-657.
- Drinan, Joanne, and Frank R. Spellman. *Water and Wastewater Treatment: A Guide for the Nonengineering Professional*. 2nd ed. Boca Raton, FL: CRC Press, 2013.
- Duarte, Rosa, Vicente Pinilla, and Ana Serrano. "The effect of globalisation on water consumption: A case study of the Spanish virtual water trade, 1849–1935." *Ecological Economics* 100, (April 2014): 96-105. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Dunn, Dana. *The practical researcher: a student guide to conducting psychological research*. 2nd ed. Chichester, West Sussex England: Wiley-Blackwell, 2010.
- Einstein, Albert. *Relativity, the special and the general theory: a popular exposition*. New York, N.Y.: Bonanza, 1961.
- Ecosystems and Human Well-Being: A Framework for Assessment. Washington, DC: Island Press, 2003.
- Educational Theory. Boulder, Colo.: Westview Press, 1998.
- El-Sayed, Y. M., and R. S. Silver. "Fundamentals of Distillation." Chapter 2 in Spielger, K. S., and A. D. K. Laird. *Principles of Desalination*. 2nd ed., Part A. New York, NY: Academic Press, 1980.
- Environmental Protection Agency. <https://www.epa.gov/aboutepa> (accessed November 7, 2016).
- Ernst, C., Katz, L., and Barrett, M. "Removal of Dissolved Copper and Zinc from Highway Runoff via Adsorption." *Journal of Sustainable Water in the Built Environment* (2015): 04015007.
- Evens, T M S. *Anthropology as ethics: nondualism and the conduct of sacrifice*. pbk. ed. New York: Berghahn Books, 2009.
- Fagan, Joseph. *West Orange*. Postcard history series. Charleston, S.C.: Arcadia Publishing, 2009.
- Falkenmark, Malin. "Shifts in Thinking to Address the 21st Century Hunger Gap." In *Integrated Assessment of Water Resources and Global Change*. Edited by Eric Craswell, Mike Bonnell, et al. Springer, 2007.

- Falkenmark, Malin, and Johan Rockstrom. "The New Blue and Green Water Paradigm: Breaking New Ground for Water Resources Planning and Management." *Journal of Water Resources Planning and Management* 132, no. 3 (2006): 129–32.
- Fischer, Hugo B., John E. List, C. Robert Koh, Jorg Imberger, and Norman H. Brooks. *Mixing in Inland and Coastal Waters*. Burlington, MA: Academic Press, 1979.
- Fishman, Charles. *The big thirst: the secret life and turbulent future of water*. New York: Free Press, 2011.
- Flint, K. and Davis, A. "Pollutant Mass Flushing Characterization of Highway Stormwater Runoff from an Ultra-Urban Area." *Journal of Environmental Engineering* (2007): 616-626.
- Flint Water Study. <http://flintwaterstudy.org/> (accessed November 7, 2016).
- Fonger, Ron. "Flint water still unsafe without lead filters, professor says." *Mlive.com*, December 02.
[2015http://www.mlive.com/news/flint/index.ssf/2015/12/lead_levels_in_flints_water_st.html#incart_story_package](http://www.mlive.com/news/flint/index.ssf/2015/12/lead_levels_in_flints_water_st.html#incart_story_package).
- Fontana, David. *The Secret Language of Symbols: A Visual Key to Symbols and Their Meanings*. San Francisco, CA: Chronicle Books, 1994.
- Francey, M., Fletcher, T., Deletic, A., and Duncan, H. "New Insights into the Quality of Urban Storm Water in South Eastern Australia." *Journal of Environmental Engineering* (2010): 381-390.
- Freire, Paulo. *Pedagogy of the Oppressed*. 30th ed. New York: Continuum, 2000.
- _____. *Teachers as Cultural Workers: Letters to Those Who Dare Teach*. The Edge, Critical Studies in Educational Theory. Boulder, Colo.: Westview Press, 1998.
- Freshwater Action Network. <http://www.freshwateraction.net/content/about-us-0> (accessed November 7, 2016).
- Gadbois, L. E. *Environmental Feasibility of Using Wetlands to Treat Runoff Pollution*. San Diego: PN, 1989.
- Glazer, Steven, and Huston Smith, eds. *The Heart of Learning: Spirituality in Education. A New Consciousness Reader*. New York: J.P. Tarcher/Putnam, 1999.
- Gebara, Ivone. *Longing for running water: ecofeminism and liberation*. Minneapolis, MN: Fortress Press, 1999.
- Gleick, James. *Chaos: making a new science*. New York, N.Y., U.S.A.: Penguin, 1988.

- Global Fresh Initiative. <https://woods.stanford.edu/research/centers-programs/global-freshwater-initiative> (accessed November 7, 2016).
- Global Water Partnership. <http://www.gwp.org/> (accessed November 7, 2016).
- Goldbaum, Kate. "Lead Poisoning Threatens Michigan Kids: What Are the Risks?" *Live Science*, December 21, 2015.
- González, Justo L. *Mañana: Christian Theology from a Hispanic Perspective*. Nashville: Abingdon Press, 1990.
- Grant, Eugene Lodewick, and Richard S. Leavenworth. *Statistical quality control*. 5th ed. New York: McGraw-Hill, 1980.
- Gruwell, Erin. *The Freedom Writers diary: how a teacher and 150 teens used writing to change themselves and the world around them*. movie tie-in ed. New York: Broadway Books, 2006.
- Guidelines for Drinking-Water Quality. 3rd ed. Geneva: World Health Organization, 2004-. Accessed November 2, 2016. <http://site.ebrary.com/id/10075418>.
- Gutiérrez, Gustavo. *Las Casas: In Search of the Poor of Jesus Christ*. Translated by Robert R. Barr. Eugene, OR: Wipf and Stock, 2003.
- Hayen, Todd. "Ancient Egyptian sacred science and the loss of soul in modern materialism." Ph.D. diss., Pacifica Graduate Institute, 2014.
- Hajny, Kristian. "WATER AND WEALTH: A GUATEMALAN CASE STUDY." *Journal Of Economics & Economic Education Research* 16, no. 2 (May 2015): 119-136. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Hammer, Mark J., and Mark J. Hammer, Jr. "Water Processing." Chapter 7 in *Water and Wastewater Technology*. Upper Saddle River, NJ: Pearson/Prentice Hall, 2007.
- Hart, John. *Sacramental commons: Christian ecological ethics*. Nature's meaning. Lanham, Md.: Rowman & Littlefield Publishers, 2006.
- Harvard Business Review On Leadership. Harvard Business Review Paperback Series. Boston, MA: Harvard Business School Press, 1998.
- He, J., Valeo, C., Chu, A., and Neumann, N. "Characterizing Physicochemical Quality of Storm-Water Runoff from an Urban Area in Calgary, Alberta." *Journal of Environmental Engineering* (2010): 1206-1217.
- Hodgson, Peter Crafts. *Revisioning the church: ecclesial freedom in the new paradigm*. Philadelphia: Fortress Press, 1988.

- Huang, J., Tu, Z., Du, P., Li, Q., and Lin, J. "Analysis of rainfall runoff characteristics from a subtropical urban lawn catchment in South-east China." *Frontiers of Environmental Science & Engineering* (2011):531-539.
- Huang, J., Tu, Z., Du, P., Lin, J., and Li, Q. "Uncertainties in stormwater runoff data collection from a small urban catchment, Southeast China." *Journal of Environmental Sciences* (2011): 1703-1709.
- Hubbard, L Ron. *Clear body, clear mind: the effective purification program*. Los Angeles, Calif.: Bridge Publications Inc, 2013.
- Im, J., Cho, K., and Gil, K. C. "Determination of the first-flush criteria from railway bridge area." *Desalination and Water Treatment* (January 2016): 694-708.
- Izdebski, Adam, et al. "On the use of palynological data in economic history: New methods and an application to agricultural output in Central Europe, 0–2000 AD." *Explorations In Economic History* 59, (January 2016): 17-39. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Jaradat, A., Dissanayake, D., Holsen, T., Fu, J., Nichols, R., and Grimberg, S. "Green Courtyard System to Remove Fluoride from Stormwater: Modeling and Field Measurements." *Environmental Engineering Science* (2013): 573-581.
- Jarvie, Helen P., and Alan Jenkins. "Accounting for Ecosystem Services in Water Quality Standards Compliance." *Environmental Science & Technology* 48, no. 24 (December 16, 2014): 14072-14074. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Jeon, Jaeyoung. *The Call of Moses and the Exodus Story: a Redactional-Critical Study in Exodus 3-4 and 5-13*. Tübingen: Mohr Siebeck, 2013.
- Ji, Zhen-Gang. *Hydrodynamics and Water Quality: Modeling Rivers, Lakes, and Estuaries*. Hoboken, N.J.: Wiley-Interscience, 2008.
- Johnson, Maxwell E. *The rites of Christian initiation: their evolution and interpretation*. rev. and expanded ed. Collegeville, Minn.: Liturgical Press, 2007.
- Jones, Serene, and Paul Lakeland. *Constructive Theology: A Contemporary Approach to Classical Themes with Cd-Rom*. Minneapolis: Fortress Press, 2005.
- Jung, A., Cann, P., Roig, B., Thomas, O., Baurès, E., and Thomas, M. "Microbial Contamination Detection in Water Resources: Interest of Current Optical Methods, Trends and Needs in the Context of Climate Change." *International Journal of Environmental Research and Public Health* (June 2014): 4292-4310.
- Kamen, Henry. *The Spanish Inquisition: a historical revision*. New Haven: Yale University Press, 1998.

- Kayhanian, M., Fruchtman, B., Gulliver, J., Montanaro, C., Ranieri, E., and Wuertz, S. "Review of highway runoff characteristics: Comparative analysis and universal implications." *Water Research* (2014): 6609-6624.
- Kim, L., Kayhanian, M., Zoh, K., and Stenstrom, M. "Modeling of highway stormwater runoff." *Science of The Total Environment* (2005): 1-18.
- Kim, L., Ko, S., Jeong, S., and Yoon, J. "Characteristics of washed-off pollutants and dynamic EMCs in parking lots and bridges during a storm." *Science of the Total Environment* (2007): 178-184.
- Knitter, Paul F. *Introducing Theologies of Religions*. Maryknoll, N.Y.: Orbis Books, 2002.
- Koenig, John. *Rediscovering New Testament prayer: boldness and blessing in the name of Jesus*. New York, NY: HarperSanFrancisco, 1992.
- Kok, Johnson Lim Teng. *The Sin of Moses and the Staff of God: a Narrative Approach*. Assen: Brill, 1997.
- Koo, Y., Kim, J., Kim, B., and Seo, D. "Removal of Suspended Solids from Stormwater Runoff Using a Fabric Filter System." *Journal of Korean Society of Environmental Engineers* (2015): 165-174.
- Köstenberger, Andreas J. *A Theology of John's Gospel and Letters*. Grand Rapids, MI: Zondervan, 2009.
- Kuhn, Thomas S. *International Encyclopedia of Unified Science*. 2 ed. Vol. 2, *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1970.
- Kumar, Manjit. *Quantum: Einstein, Bohr and the Great Debate About the Nature of Reality*. Thriplow: Icon, 2009.
- Labour and Therapy. West Hoathly, W. Sussex: Clairview, 2014.
- Lee, C., Seo, G., Yoon, C., Kwon, H., Lee, J., and Cheon, S. "Estimation of Runoff Characteristics of Nonpoint Pollutant Source in Railroad Area." *Journal of Environmental Science International* (2014): 511-520.
- Lee, Dorothy A. *Flesh and glory: symbol, gender, and theology in the Gospel of John*. New York: Crossroad, 2002.
- Lee, J., Bang, K., Ketchum, L., Choe, J., and Yu, M. "First flush analysis of urban storm runoff." *Science of the Total Environment* (2002): 163-175.
- Lichtheim, George. *George Lukács. Modern Masters*. New York: Viking Press, 1970.

- Lin, Chih-lung. 2012. "The British dynamic mail contract on the North Atlantic: 1860–1900." *Business History* 54, no. 5: 783-797. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Liu, A., Goonetilleke, A., and Egodawatta, P. "Taxonomy for rainfall events based on pollutant wash-off potential in urban areas." *Ecological Engineering* (2002): 110-114.
- Loeb, Nancy. "Toxic Water Isn't Just in Michigan." *Time Magazine*, December. 21, 2015.
- Ludwig, Art. "Thinking About Water." Chapter 1 in *Water Storage*. Oasis Design, 2005.
- Luo, Z., Wang, T., Gao, M., Tang, J., and Zhu, B. (2012). "Stormwater runoff pollution in a rural township in the hilly area of the central Sichuan Basin, China." *Journal of Mountain Science* (2012): 16-26.
- Lustgarten, Abrahm. "Buried Secrets: Is Natural Gas Drilling Endangering U.S. Water Supplies?" ProPublica (November 13, 2008).
- Machado, Victoria. *Journal of Agricultural & Environmental Ethics*. (October 2016): 897-904.
- Mannina, G. and Viviani, G. "An urban drainage stormwater quality model: Model development and uncertainty quantification." *Journal of Hydrology* (2010): 248-265.
- Mara, D. *Domestic Wastewater Treatment in Developing Countries*. London, UK: Earthscan, 2003.
- Maw, Peter, Terry Wyke, and Alan Kidd. "Canals, rivers, and the industrial city: Manchester's industrial waterfront, 1790-1850." *Economic History Review* 65, no. 4 (November 2012): 1495-1523. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- McDonnell, Rachael A. "Challenges for Integrated Water Resources Management: How Do We Provide the Knowledge to Support Truly Integrated Thinking." *International Journal of Water Resources Development* 24, no. 1 (2008): 131–43.
- McConnell, Kathryn. "Safe Water Means Better Health in Ghana, Cambodia." America.gov (2011).
- McIlroy, John. "Waving or drowning? British labor history in troubled waters." *Labor History* 53, no. 1 (February 2012): 91-119. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- McManners, John, ed. *The Oxford Illustrated History of Christianity*. Oxford: Oxford University Press, 1990.

- McConnell, Kathryn. "Safe Water Means Better Health in Ghana, Cambodia." America.gov (2011).
- Meng, Yi. "*Water reuse planning model for the greater Chicago area.*" Ph.D. diss., Illinois Institute of Technology, 2009.
- Menuge, Angus J L., ed. Reading God's World: The Scientific Vocation. St. Louis, Mo.: Concordia Pub. House, 2004.
- Milly, P. C. D., Julio Betancourt, et al. "Stationarity is Dead: Whither Water Management?" Science 319, no. 5863 (2008): 573–4.
- Milstein, Sara. "*Reworking ancient texts: Revision through introduction in biblical and Mesopotamian literature.*" Ph.D. diss., New York University, 2011.
- Milton, John. Paradise Lost. Dover Giant Thrift Editions. Mineola, N.Y.: Dover Publications, 2005.
- Minke, Gernot. "Inclined Green Roofs - Ecological and Economical Advantages, Passive Heating and Cooling Effect." CESB07 Prague: Proceedings International Conference Central Europe towards Sustainable Building, (2007).
- Montenegro, Maywa. "The Truth About Water Wars." SEED Magazine (May 14, 2009).
- Molden, David, Jean-Marc Faures, et al. "Setting the Scene." Chapter 1 in Water for Food, Water for Life. Edited by David Molden. International Water Management Institute, 2007.
- Moorman, John R H. The Anglican Spiritual Tradition. pbk. ed. Springfield, IL: Templegate, 1983.
- Murphy, L., Cochrane, T., and O'Sullivan, A. "Build-up and wash-off dynamics of atmospherically derived Cu, Pb, Zn and TSS in stormwater runoff as a function of meteorological characteristics." Science of The Total Environment (2015): 206-213.
- Mustafa, Daanish. Water Resource Management in a Vulnerable World: the Hydro-Hazardscapes of Climate Change. New York: I.B.Tauris, 2013.
- MWH Staff. Water Treatment: Principles and Design. 2nd ed. New York, NY: Wiley, 2005
- Nasar, Sylvia. Grand Pursuit: The Story of Economic Genius. New York: Simon & Schuster, 2011.
- Nelson, Theresa C., Cynthia Ingols, et al. "Susan Murcott and Pure Home Water: Building a Sustainable Mission-Driven Enterprise in Northern Ghana." Entrepreneurship Theory and Practice 35, no. 6 (2011).

- Noor, M., Mohammad, T., and Ghazali, A. "Assessment of using hollow fibre microfiltration in treating lake water." *Desalination and Water Treatment* (2016): 23232-23245.
- Northouse, Peter Guy. *Leadership: Theory and Practice*. seventh ed. Los Angeles: SAGE Publications, Inc., 2015.
- O'Connor, Joseph, and Ian McDermott. *The art of systems thinking: essential skills for creativity and problem solving*. London: Thorsons, 1997.
- Office of the High Commissioner for Human Rights. "A Landmark Decision to Make the Right to Water and Sanitation Legally Binding." United Nations, October 6, 2010.
- On care for our common home: the encyclical letter laudato si'*. Mahwah, NJ: Paulist, 2015.
- Otero, Iago, et al. "Water scarcity, social power and the production of an elite suburb: The political ecology of water in Matadepera, Catalonia." *Ecological Economics* 70, no. 7 (May 15, 2011): 1297-1308. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Pagola, José Antonio. *Jesus, an historical approximation*. Series Kyrios. Miami, Fla.: Convivium Press, 2009.
- Palaniappan, Meena, and Peter H. Gleick. "Peak Water." Chapter 1 in *The World's Water 2008–2009*. Island Press, 2008.
- Pardes, Ilana. *Contraversions*. Vol. 14, *The Biography of Ancient Israel: National Narratives in the Bible*. Berkeley: University of California Press, 2000.
- Patte, Daniel. *The Cambridge Dictionary of Christianity*. Cambridge: Cambridge University Press, 2010.
- Pennington, Karrie Lynn, and Thomas V. Cech. "Water Allocation Law." Chapter 12 in *Introduction to Water Resources and Environmental Issues*. Cambridge University Press, 2010.
- Penrose, Roger. *The Road to Reality: A Complete Guide to the Laws of the Universe*. American ed.
- Peppard, Christiana Z. *Just Water: Theology, Ethics, and the Global Water Crisis*. Maryknoll, New York: Orbis Books, 2014.
- Percy, Martyn, J Barney Hawkins, Mark D. Chapman, and Ian S. Markham, eds. *Christ and Culture*. *Canterbury Studies in Anglicanism*. Harrisburg, PA: Morehouse Pub., 2010.

- Petersen, T., Rifai, H., Suarez, M., and Stein, A. "Bacteria Loads from Point and Nonpoint Sources in an Urban Watershed." *Journal of Environmental Engineering* (2005): 1414-1425.
- Peppard, Christiana Z. *Just Water: Theology, Ethics, and the Global Water Crisis*. Maryknoll, New York: Orbis Books, 2014.
- Pirsig, Robert M. *Lila: an inquiry into morals*. New York: Bantam Books, 1991.
- Podolak, Kristen, et al. "Designing with Nature? The persistence of Capability Brown's 18th century water features." *Landscape Journal* 32, no. 1 (January 2013): 51-64. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Postel, Sandra. "In Harmony with Earth's Water Cycle." Chapter 21 in *The Way We Will Be 50 Years from Today*. Edited by Mike Wallace. Thomas Nelson, 2008.
- Petry, Ray C. *The Library of Christian classics*. Vol. 13, *Late medieval mysticism*. Louisville, KY: Westminster John Knox Press, 2006.
- Raven, Charles E. *Science, religion, and the future*. Library of Anglican spirituality. London: Mowbray, 1994.
- Reichwaldt, E. and Ghadouani, A. (2012). "Effects of rainfall patterns on toxic cyanobacterial blooms in a changing climate: Between simplistic scenarios and complex dynamics." *Water Research* (2012): 1372-1393.
- Reynolds, T. D., and P. A. Richards. "Water Quality." In *Unit Operations and Processes in Environmental Engineering*. Boston, MA: PWS Publishing, 1995.
- _____. *Unit Operations and Processes in Environmental Engineering*. 2nd ed. Boston, MA: PWS Publishing Company, 1996.
- Richardson, Cyril Charles, ed. *Early Christian Fathers*. Touchstone ed. New York: Simon & Schuster, 1996.
- Rickert, Kathryn. "*Talking back to God: Some implications of narrative biblical laments for human-divine relations and Christian worship*." Ph.D. diss., Union Institute and University, 2009.
- Ring, Bonnie. *Women Who Knew Jesus*. Bloomington, IN: AuthorHouse, 2015.
- Rivers, Francine. *Sons of Encouragement*. Wheaton, Ill.: Tyndale House Publishers, Inc., 2011.
- Robbins, Richard H. *Global problems and the culture of capitalism*. 3rd ed. Boston: Pearson Allyn and Bacon, 2005.
- Rogers, Peter. "Facing the Freshwater Crisis." *The Scientific American*, August 2008.

- Rosenbaum, Walter A. *Environmental politics and policy*. 7th ed. Washington, D.C.: CQ Press, 2008.
- Rowell, Geoffrey, and Kenneth Stevenson. *Love's Redeeming Work: The Anglican Quest for Holiness*. Oxford: Oxford University Press, 2003.
- Rubin, Isaak Il'ich. *A history of economic thought*. London: Ink Links, 1979.
- Sacred Writings: Practically Adapted to the Instruction of Private Families (Classic Reprint).
- Sandidge, Sue. *Forty Years in the Wilderness: Moses Leads the Bible's Lost Generation*. publication place: Xlibris, 2005.
- Santmire, H Paul. *The Travail of Nature: The Ambiguous Ecological Promise of Christian Theology*.
- Schiff, K., Tiefenthaler, L., Bay, S., and Greenstein, D. (2016). "Effects of Rainfall Intensity and Duration on the First Flush from Parking Lots." *Water* (July 2016): 320.
- Schneiders, Sandra Marie. *The Revelatory Text: Interpreting the New Testament as Sacred Scripture*. 2nd ed. Collegeville, Minn.: Liturgical Press, 1999.
- Scholes, Robert. *Semiotics and interpretation*. New Haven: Yale University Press, 1982.
- Schreiner, Thomas R. *Interpreting the Pauline Epistles*. 2nd ed. Grand Rapids, Mich.: Baker Academic, 2011.
- Schüssler Fiorenza, Elisabeth. *Bread Not Stone: The Challenge of Feminist Biblical Interpretation*. 10th ed. Boston: Beacon Press, 1995.
- Scigaj, Leonard M. *Twayne's English authors series*. Vol. 486, *Ted Hughes*. Boston: Twayne Publishers, 1991.
- Scruton, Roger. *A short history of modern philosophy: from Descartes to Wittgenstein*. 2nd ed. London: Routledge, 1995.
- Seyfried, Lisa. "When it comes to water, we are all equal': Establishing the Relationship between Women and Water." M.A. diss., The George Washington University, 2011.
- Smith, Huston. *The world's religions: our great wisdom traditions*. San Francisco: HarperSanFrancisco, 1991.
- Sobrinho, Jon. *Jesus the Liberator: A Historical-Theological Reading of Jesus of Nazareth*. Maryknoll, N.Y.: OrbisBooks, 1993.

- Stanford University. <http://web.stanford.edu/group/narratives/classes/08-09/CEE215/Projects/greendorm/water/GraywaterCD/graywater08/Research%20Articles/ET04GryWtrQual.pdf> (accessed November 7, 2016).
- Stanley, Andy. *Next generation leader: five essentials for those who will shape the future*. Sisters, Oregon: Multnomah Publishers, 2003.
- Stone, Deborah A. *Policy Paradox: The Art of Political Decision Making*. Rev. ed. New York: Norton, 2002.
- Takahasi, Yutaka. "History of Water Management in Japan from the End of World War II." *International Journal Of Water Resources Development* 25, no. 4 (December 2009): 547-553. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Tamberino, Anthony. "*Ancient Maya Reservoirs and their Role in the Abandonment of Tikal, Guatemala: A Multi-Proxy Investigation of Solid Sediment Cores*." M.A. diss. University of Cincinnati, 2013.
- Tang, J., Aryal, R., Deletic, A., Gernjak, W., Glenn, E., McCarthy, D., and Escher, B. "Toxicity characterization of urban stormwater with bioanalytical tools." *Water Research* (2013): 5594-5606.
- Tejada-Guibert, J. and Maksimovic, C. Urban water issues—An international perspective. *Water: Science, Policy, and Management: Challenges and Opportunities* (2003): 43-77.
- Tchobanoglous, G., F. L. Burton, and H. D. Stensel. *Wastewater Engineering: Treatment and Reuse*. 4th ed. Metcalf and Eddy Inc., New York, NY: McGraw-Hill, 2003.
- The Inclusive Bible: The First Egalitarian Translation. pbk. ed. Lanham, Md.: Rowman and Littlefield Publishers, 2009.
- The Oxford Illustrated History of Christianity. Oxford: Oxford University Press, 1990.
- The Rights Water and Sanitation. <http://www.righttowater.info/> (accessed November 7, 2016).
- The World Water Council. <http://www.worldwatercouncil.org/> (accessed November 7, 2016).
- The World's Water. <http://worldwater.org/> (accessed November 7, 2016).
- Thomas. *St. Thomas Aquinas On Politics and Ethics: A New Translation, Backgrounds, Interpretations*. Edited and translated by Paul E. Sigmund. A Norton Critical Edition. New York: Norton, 1988.

- Thoreau, Henry David. *Walden: Civil Disobedience*. The Penguin American Library. Harmondsworth, Middlesex, England: Penguin Books, 1983.
- Tipler, Frank J. *The physics of immortality: modern cosmology, God, and the resurrection of the dead*. New York: Doubleday, 1994.
- Tippett, Krista. *Speaking of Faith: Why Religion Matters--and How to Talk About It*. New York, N.Y.: Penguin, 2008.
- Tolstoy, Leo. *The kingdom of God is within you: Christianity not as a mystic religion but as a new theory of life*. Lincoln: University of Nebraska Press, 1984.
- Torrance, Robert M. *The Spiritual Quest: Transcendence in Myth, Religion, and Science*. Berkeley: University of California Press, 1997.
- Trenouth, W. and Gharabaghi, B. (2016). "Highway runoff quality models for the protection of environmentally sensitive areas." *Journal of Hydrology* (2016): 143-155.
- United Nations Environment Programme Global Environment Monitoring System (GEMS)/Water Programme.
http://www.unep.org/gemswater/Portals/24154/pdfs/op_guide_for_data_2005.pdf
 (accessed November 7, 2016).
- United Nations High Commissioner for Human Rights. "A landmark decision to make the right to water and sanitation legally binding." (accessed November 7, 2016).
- Urbina, Ian. "Regulation Lax as Gas Wells' Tainted Water Hits Rivers," *New York Times*, February 26, 2011.
- Viessman, W., Jr., and M. J. Hammer. *Water Supply and Pollution Control*. 7th ed. Pearson Education, Inc., Upper Saddle River, NJ: Pearson Prentice Hall, 2005.
- Vorosmarty, C. J., P. B. McIntyre, et al. "Global Threats to Human Water Security and River Biodiversity." *Nature* 467 (2010): 555–61.
- Waara, S. and Färm, C. (2008). "An assessment of the potential toxicity of runoff from an urban roadscape during rain events." *Environmental Science and Pollution Research* (2008): 205-210.
- Wang, L., Wei, J., Huang, Y., Wang, G., and Maqsood, I. "Urban nonpoint source pollution buildup and washoff models for simulating storm runoff quality in the Los Angeles County." *Environmental Pollution* (2011):1932-1940.
- Wang, Y., Chen, C., and Lin, J. "The Measurement of Dry Deposition and Surface Runoff to Quantify Urban Road Pollution in Taipei, Taiwan." *International Journal of Environmental Research and Public Health* (2013): 5130-5145.

- Walt, Stephen M. *Revolution and war*. Cornell studies in security affairs. Ithaca, NY: Cornell University Press, 1996.
- Wargo, John. *Green Intelligence: Creating Environments That Protect Human Health*. New Haven, Conn.: Yale University Press, 2009.
- Warhurst, J., Parks, K., McCulloch, L., and Hudson, M. "Front gardens to car parks: Changes in garden permeability and effects on flood regulation." *Science of The Total Environment* (2014): 329-339.
- Water in the Schools. <http://waterinschools.org/> (accessed November 7, 2016).
- Water Quality Association. <https://www.wqa.org/> (accessed November 7, 2016).
- Water Supply and Sanitation Collaborative Council. <http://wsscc.org/global-sanitation-fund/> (accessed November 7, 2016).
- "Water, water, everywhere." *Economist* 420, no. 9006 (September 10, 2016): 75-76. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Watkins, John. *Scripture Biography, or the Lives and Characters of the Principal Personages, Recorded in the Sacred Writings: Practically Adapted to the Instruction of Private Families (Classic Reprint)*. Charleston: Forgotten Books, 2016.
- Weart, Spencer R. *The discovery of global warming*. New histories of science, technology, and medicine. Cambridge, Mass.: Harvard University Press, 2003.
- Whelton, Andrew J., et al. "Residential Tap Water Contamination Following the Freedom Industries Chemical Spill: Perceptions, Water Quality, and Health Impacts." *Environmental Science & Technology* 49, no. 2 (January 20, 2015): 813-823. *Business Source Premier*, EBSCOhost (accessed November 9, 2016).
- Webber, Michael E. *Thirst for power: energy, water and human survival*. New Haven: Yale University Press, 2016.
- Weber, Max. *Protestant Ethic and the Spirit of Capitalism*. New York: Charles Scribner's Sons, 1958.
- Whitehead, Alfred North. *Gifford lectures*. corrected ed. Vol. 1927-28, *Process and reality: an essay in cosmology*. New York: Free Press, 1978.
- Wicks, Robert J., ed. *Handbook of Spirituality for Ministers*. 2 vols. New York: Paulist Press, 1995-2000.
- Wilczek, Frank. *A beautiful question: finding nature's deep design*. New York: Penguin Press, 2015.

- Wildavsky, Aaron B. *Moses as Political Leader*. 2nd ed. Jerusalem: Shalem Press, 2005.
- Willems, P. "Parsimonious Model for Combined Sewer Overflow Pollution." *Journal of Environmental Engineering* (2009): 316-325.
- Williams, Rowan. *Being Christian: Baptism, Bible, Eucharist, Prayer*. Grand Rapids, Michigan: William B. Eerdmans.
- Willimon, William H. *Pastor: The Theology and Practice of Ordained Ministry*. Nashville, TN: Abingdon Press, 2002.
- Wills, Garry. *Why priests? a failed tradition*. New York, New York: Penguin Books, 2014.
- Woelfle-Erskine, Cleo, Berit Anderson, et al. "6 Simple Ways to Bring the Water Revolution Home." *Yes!* (May 27, 2010).
- Wolf, Aaron T., Shira B. Yoffe, et al. "International Waters: Identifying Basins at Risk." *Water Policy* 5, no. 1 (2003): 29–60.
- Worster, Donald. "Water in the Age of Imperialism — and Beyond." Chapter 1 in *A History of Water: Volume III: The World of Water*. Edited by Terje Tvedt and Terje Oestigaard. I. B. Tauris, 2006.
- Xantilli8. "Babylonia Water Tower." April 23, 2011. YouTube. Accessed November 7, 2016.
http://www.youtube.com/watch?v=wqRXleK69Y8_
- Yount, Scot. "Officials Keep Close Eye on Upper Mystic River Dam in Arlington, Mass." *New England Cable News*, March 30, 2010.
- Zeller Jr., Tom. "E.P.A. Considers Risks of Gas Extraction," *New York Times*, July 23, 2010.
- Zinn, Howard. *A People's History of the United States: 1492-2001*. new ed. New York, New York: HarperCollins, 2003.
- Zinn, Howard, and Donaldo P. Macedo. *Howard Zinn on democratic education*. Series in critical narrative. Boulder, Colo.: Paradigm Publishers, 2005.
- Zolnikov, Tara Rava. 2013. "The Maladies of Water and War: Addressing Poor Water Quality in Iraq." *American Journal of Public Health* 103, no. 6: 980-987.
Business Source Premier, EBSCOhost (accessed November 9, 2016).

APPENDIX B – SAMPLE OF SERMONS

March 19, 2017

Holy Trinity Episcopal Church
West Orange, N.J.
Water is life

Sermon by the Rev. Miguel A. Hernandez

In today's gospel, we meet Jesus sitting by a well, Jacob's well. A Samaritan woman comes to the well to draw water, and Jesus asks her for a drink. This scene highlights how essential water is in our everyday life, and Jesus knew that everyone had to go to the well to get water. Why? Because water is life.

We use water at all times, and because of this, we in this part of the world take water for granted.

Do you know that on average a human body ranges from 57 - 60 per cent of water?²³⁷

Do you know that the human brain is about 73 per cent water?

These are astonishing numbers since our bodies are mostly comprised of water.

We are made of and are surrounded by water.

We do a lot of things with water: We bath, we wash, we swim, prepare food, and we drink it, and so on.

In fact, "each person on Earth requires at least 20 to 50 liters of clean, safe water a day" to live.²³⁸ That is about 5 to 13 gallons of water.

Thus, water is essential for sustaining life. Water is life.

Water has played an important part in our Christian tradition. We are baptized in water. When preparing the elements for the Eucharist, we add water to the wine and juice.

In fact, there was a time when water was an element of the Eucharist instead of wine.

At the time of our baptismal vows, the bishop sprinkles water on us.

Similarly, other religious traditions use water in their rituals. In Hinduism, the Ganges River is very sacred and practicing Hindus bathe in the River since they believe that bathing in the river causes the remission of sins.

²³⁷ Take from <https://www.thoughtco.com/how-much-of-your-body-is-water-609406> on March 13, 2017.

²³⁸ Taken from <https://www.koshland-science-museum.org/water/html/en/Overview/Why-is-Safe-Water-Essential.html> on March 12, 2017.

In the book of Genesis, it says that “the Spirit of God was hovering over the waters.” In the first chapter of the creation story, we are introduced to the element of water—H₂O for those who know the chemical formula for water.

Water also played an important role in the formation of civilizations as people gathered around large bodies of water to form communities around the world.

For example, “between 3000 and 2000 B.C.E. ... civilizations formed independently of each other along the Indus, the Nile, the Tigris and Euphrates, and the Yellow Rivers”.²³⁹

In the Exodus story, we read about the first plague in which the waters of the Nile river were turned into blood (Exodus 7:14-24).

The waters of the Nile were polluted and unsafe to drink, producing death.

This points to the idea that water has to be clean, and it has to be safe to drink in order to sustain life.

Just as societies were formed all over the world around water, it became necessary for water to be brought into the cities. Aqueducts were designed in Ancient Rome, for example, to meet the basic needs such as, the Roman baths and for irrigation and drinking fountains for people.

In our modern society, we use pipes to bring water from the aquifers to our towns. In other cases, the water is obtained directly from wells.

As water is moved from one place to another, contaminants such as heavy metals, industrial chemicals, pesticides, and other waste enter the water system and become part of the final product that we consume in our communities.

Pollutants in the water can cause negative health effects, impairing welfare, and affecting negatively the quality of life.

Fast forward to the present, there have been news of water contamination in Detroit, Michigan and in Newark, NJ. The issue in these two cities was lead contamination.

In last few months, there have been additional reports of others towns and cities in which similar contamination has been uncovered.

Why should we be so concerned with water contamination in West Orange, NJ?

I have a couple reasons to share with you as to why we should be concerned: 1) Lead poisoning is detrimental to the developmental formation of children below 6 years of age and to pregnant women; 2) Homes or buildings constructed before 1920 have a high probability of containing pipes made of Lead or that Lead was used as a solder.

²³⁹ Taken from <http://arthistoryworlds.org/early-river-valley-civilizations/> on March 10, 2017.

As an example, Holy Trinity was built in 1907, and it might have lead pipes.

Therefore, to remove our doubts we will need to test the water to find out what is going on in this regard. Likewise, you have to test the water in your houses or apartments to make sure that the lead levels are below the standard provided by the Environmental Protection Agency (EPA).

What do we need to know?

First, let us become familiar with the standard for Lead in tap water. According to the EPA it should be below 15 ppb. That is, 15 parts per one billion.

Second, if we find that the level is higher than 15 ppb, then for some cases we just let the water tap run for 30 seconds or more before it is used for drinking and cooking.

Third, if there are children below 6 years of age and or there is a pregnant woman in the house and the lead level is found to be higher than 15 ppb, have them tested for lead poisoning.

Let us remember that the important point here is that we are being informed about the risks of lead poisoning from using the water so that we can take the appropriate measures.

In the Gospel story this morning, Jesus asks the Samaritan woman for water.

The woman said to him, “Sir, you have no bucket, and the well is deep. Where do you get that living water?”

In the conversation, Jesus conveys the message that we all need the living water that gives us eternal life. He uses the image of water as essential to our everyday life to convey his message of the God-given living water he will give to sustain our spiritual life.

We need the water to sustain us. Therefore, it is clear that when we cannot obtain the water by our means, we depend on others like the water companies to provide the needed safe water to drink.

Similarly, we need to take care of the source of water and its transport mechanisms to be able to drink that water that gives us life. We need to learn about the water quality that we consume and take care of our homes as well as Holy Trinity.

The God and Science project that started in the summer of 2014 has now blossomed to become a teaching community to provide educational opportunities about Water Quality to Holy Trinity and those around our community.

Remember we need water to live. Thus, we need to care for our water quality.

Or do we want to be like the old mariner in Coleridge’s poem “water, water everywhere, nor any drop to drink”, or are we going to do something about it? Amen.

19 de marzo de 2017

Holy Trinity Episcopal Church
West Orange, N.J.
El agua es vida

Sermón del Rev. Miguel A. Hernández

En el evangelio de hoy, nos encontramos con Jesús sentado junto a un pozo, el pozo de Jacob. Una mujer samaritana viene al pozo para sacar agua, y Jesús le pide un poco de agua. Esta escena pone de relieve cómo el agua es esencial en nuestra vida cotidiana, y Jesús sabía que todo el mundo tenía que ir al pozo para obtener agua. ¿Por qué? Porque el agua es vida.

Utilizamos el agua en todo momento, y debido a esto, nosotros en esta parte del mundo tomamos el agua por sentado.

¿Saben ustedes que en promedio un cuerpo humano oscila entre 57 y 60 por ciento de agua?

¿Saben que el cerebro humano es aproximadamente el 73 por ciento de agua?

Estos números son asombrosos ya que nuestros cuerpos están compuestos en su mayoría de agua.

Estamos hechos y rodeados de agua.

Hacemos muchas cosas con agua: nos bañamos, nos lavamos, nadamos, preparamos comida, y la bebemos, y así sucesivamente.

De hecho, “cada persona en la Tierra requiere al menos de 20 a 50 litros de agua limpia y segura al día” para vivir. Eso es de unos 5 a 13 galones de agua.

Por lo tanto, el agua es esencial para mantener la vida. El agua es vida.

El agua ha desempeñado un papel importante en nuestra tradición cristiana. Somos bautizados en agua. Al preparar los elementos para la Eucaristía, añadimos agua al vino y el jugo de uva.

De hecho, hubo un tiempo en que el agua era un elemento de la Eucaristía en lugar del vino.

En el momento de nuestros votos bautismales, el obispo nos rocía agua.

Del mismo modo, otras tradiciones religiosas utilizan el agua en sus rituales. En el hinduismo, el río Ganges es muy sagrado y los practicantes hindúes se bañan en el río, ya que creen que al bañarse en el río provoca la remisión de los pecados.

En el libro del Génesis dice que “el Espíritu de Dios estaba flotando sobre las aguas”. En el primer capítulo de la historia de la creación, se nos presenta el elemento del agua - H₂O para aquellos que conocen la fórmula química del agua.

El agua también jugó un papel importante en la formación de civilizaciones cuando la gente se reunió alrededor de grandes cuerpos de agua para formar comunidades alrededor del mundo.

Por ejemplo, “entre 3000 y 2000 B.C.E... civilizaciones formadas independientemente entre sí a lo largo del Indus, el Nilo, el Tigris y el Éufrates, y del Río Amarillo”.

En el libro de Éxodo, leemos acerca de la primera plaga en la que las aguas del río Nilo se convirtieron en sangre (Éxodo 7: 14-24).

Las aguas del Nilo estaban contaminadas e inseguras para beber, produciendo la muerte.

Esto apunta a la idea de que el agua tiene que estar limpia, y tiene que ser segura para beber con el fin de sostener la vida.

Así como las sociedades se formaron en todo el mundo alrededor del agua, se hizo necesario que el agua fuera llevada a las ciudades. Acueductos fueron diseñados en la antigua Roma, por ejemplo, para satisfacer las necesidades básicas, tales como, los baños romanos y para el riego y fuentes de agua potable para la gente.

En nuestra sociedad moderna, usamos tuberías para llevar el agua de los acuíferos a nuestras ciudades. En otros casos, el agua se obtiene directamente de los pozos.

A medida que el agua se traslada de un lugar a otro, contaminantes como metales pesados, productos químicos industriales, pesticidas y otros residuos ingresan al sistema de agua y pasan a formar parte del producto final que consumimos en nuestras comunidades.

Los contaminantes en el agua pueden causar efectos negativos en la salud, perjudicar el bienestar y afectar negativamente la calidad de vida.

Avancemos al presente, ha habido noticias de la contaminación del agua en Detroit, Michigan y en Newark, NJ. El problema en estas dos ciudades fue la contaminación de plomo.

En los últimos meses, ha habido informes adicionales de otros pueblos y ciudades en los que se ha descubierto una contaminación similar.

¿Por qué deberíamos estar tan preocupados por la contaminación del agua en West Orange, NJ?

Tengo un par de razones para compartir con ustedes en cuanto a por qué deberíamos estar preocupados: 1) La contaminación por plomo es perjudicial para la formación del desarrollo de los niños menores de 6 años de edad y a las mujeres embarazadas; 2) Los

hogares o edificios construidos antes de 1920 tienen una alta probabilidad de contener tuberías hechas de plomo o que el plomo se haya utilizado como soldadura.

Por ejemplo, la Iglesia la Trinidad (*Holy Trinity*) fue construida en 1907, y podría tener tuberías de plomo.

Por lo tanto, para eliminar nuestras dudas tendremos que probar el agua para averiguar qué está pasando en este sentido. Del mismo modo, ustedes tienen que probar el agua en sus casas o apartamentos para asegurarse de que los niveles de plomo están por debajo del estándar proporcionado por la Agencia de Protección Ambiental (EPA).

¿Qué necesitamos saber?

En primer lugar, necesitamos familiarizarnos con el estándar del plomo en el agua potable. Según la Agencia de Protección Ambiental (EPA) debe ser inferior a 15 ppb. Es decir, 15 partes por mil millones (un billón).

En segundo lugar, si encontramos que el nivel es superior a 15 ppb, entonces en algunos casos necesitamos dejar que el grifo o chorro de agua corra durante 30 segundos o más antes de que se use para beber y cocinar.

En tercer lugar, si hay niños menores de 6 años de edad y hay una mujer embarazada en la casa y el nivel de plomo se encuentra a ser superior a 15 ppb, esas personas deberían ser evaluadas saber si tienen envenenamiento de plomo.

Recordemos que lo importante aquí es que estamos siendo informados sobre los riesgos de envenenamiento por plomo al usar el agua y para que podamos tomar las medidas apropiadas.

En la historia del Evangelio de esta mañana, Jesús le pide agua a la mujer samaritana.

La mujer le dijo: “Señor, ni siquiera tienes con que sacar el agua, y el pozo es muy hondo: ¿de dónde vas a darme agua viva?”

En la conversación, Jesús transmite el mensaje de que todos necesitamos el agua viva que nos da la vida eterna. Él utiliza la imagen del agua como esencial para nuestra vida cotidiana para transmitir su mensaje del agua viva dada por Dios que dará para sostener nuestra vida espiritual.

Necesitamos el agua para sostenernos. Por lo tanto, está claro que cuando no podemos obtener el agua por nuestros medios, dependemos de otros como las compañías de agua para proporcionar el agua potable necesaria para beber.

Del mismo modo, tenemos que cuidar la fuente de agua y sus mecanismos de transporte para poder beber esa agua que nos da vida. Tenemos que aprender sobre la calidad del agua que consumimos y cuidar de nuestros hogares, así como la Iglesia la Trinidad.

El proyecto de Dios y Ciencia que comenzó en el verano de 2014 ahora ha florecido para convertirse en una comunidad de enseñanza para proporcionar oportunidades educativas sobre la calidad del agua a la Iglesia la Trinidad y nuestra comunidad.

Recordemos que necesitamos agua para vivir. Por lo tanto, tenemos que cuidar de nuestra calidad del agua.

¿O queremos ser como el viejo marinero en el poema de Coleridge “agua, agua por todas partes, ni gota a beber”, o vamos a hacer algo al respecto? Amén.

APPENDIX C – WATER QUALITY PRESENTATION

SPANISH PRESENTATION:

ENTENDIENDO EL REPORTE DE LA CALIDAD DEL AGUA DE WEST ORANGE, NJ.

**POR EL REVDO. MIGUEL
A. HERNANDEZ**

<https://amwater.com/njaw/water-quality/water-quality-reports> (Data for 2015 - 2016)

Holy Trinity Episcopal Church – Localizada en 315 Main St. West Orange, NJ.

Date: Junio 4, 2017 Time: 2:00 pm **TOD@S SON BIENVENID@S**



¿Qué hay en
tu agua?

Dios y la Ciencia: Proyecto de Calidad del
Agua en West Orange, NJ.

A Presentation by **NEW YORK**
The Rev. Miguel A. **THEOLOGICAL**
Hernandez, D.Min. **SEMINARY**
Candidate, continuing The Biblical Seminary in New York

 Holy Trinity Episcopal Church
The Episcopal Church celebrates with

1. Entrar a la pagina Web de la Ciudad de West Orange: <http://www.westorange.org>

+myConnections: Engage your community - connect to news, events and information you care about. [View more information...](#) [Sign In](#)

TOWNSHIP OF WEST ORANGE

WHERE INVENTION LIVES

[DIRECTORY](#) [GOVERNMENT](#) [AROUND TOWN](#) [DEPARTMENTS](#) [SERVICES A-Z](#)

Search West Orange... [SEARCH](#)

[ONLINE BILL PAY](#) [REPORT A CONCERN](#)

[OUTLOOK NEWSLETTER](#) [NOTIFY ME](#)

PERMIT Information
Sign Up for Jitney Shuttle Text Alerts
Pothole Report
July 4th 2017 Weekend in West Orange
[Welcome to West Orange Video](#)

SPRING YARD WASTE CLEAN-UP GUIDELINES

Lawn & Refuse Bags
Bolsas para césped y desechos

Mar 1-May 31 by Request. [CLICK for more info](#)

NEWS & ANNOUNCEMENTS

[CLICK HERE to pay sewer bill](#)
[CLICK HERE TO PAY ONLINE](#)
**** [CLICK HERE](#) ** To Pay 2nd Quarter Tax Bill - Due May 1, 2017**
[Click Here To Pay Online](#)
Mayor Parisi's Open Office Hours 4/27
[Read on...](#)
Arbor Day Observance 4/28
[Read on...](#)

CALENDAR

April 2017

SUN	MON	TUE	WED	THU	FRI	SAT
26	27	28	29	30	31	01
02	03	04	05	06	07	08
09	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	01	02	03	04	05	06

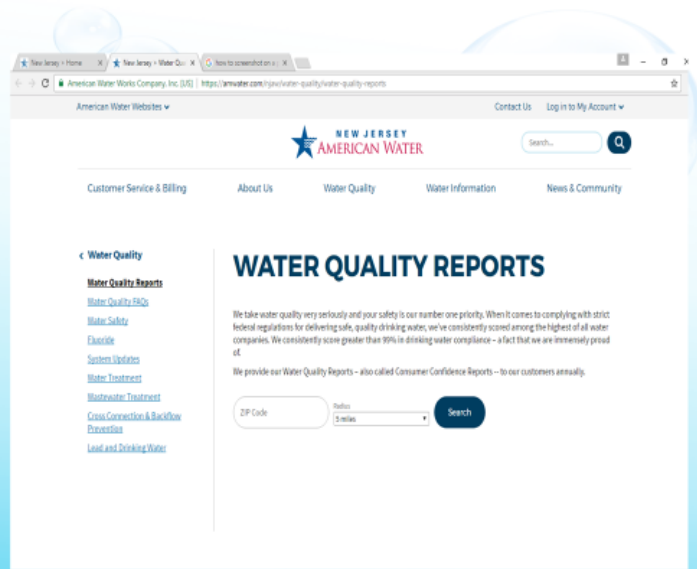
Mon, Apr. 17
VPW Post 376 Meeting
Tue, Apr. 18
SPECIAL: Historic Preservation Commission Meeting
Wed, Apr. 19
Downtown Alliance Meeting
[VIEW ALL](#)

NEWS

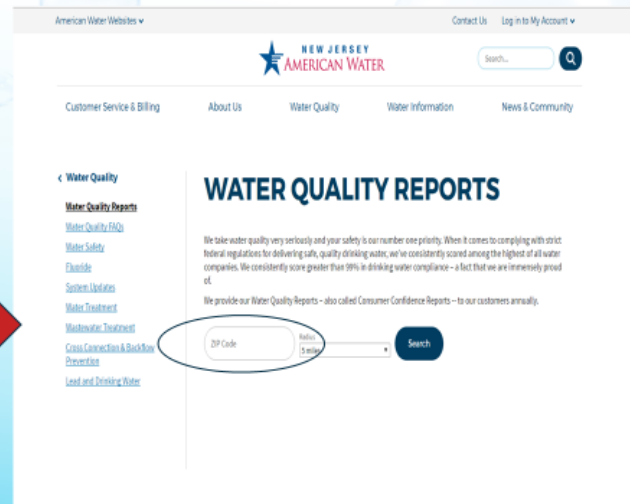
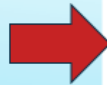
[West Orange Police Dept](#)

2. Entrar a la pagina Web de la NJ American Water:

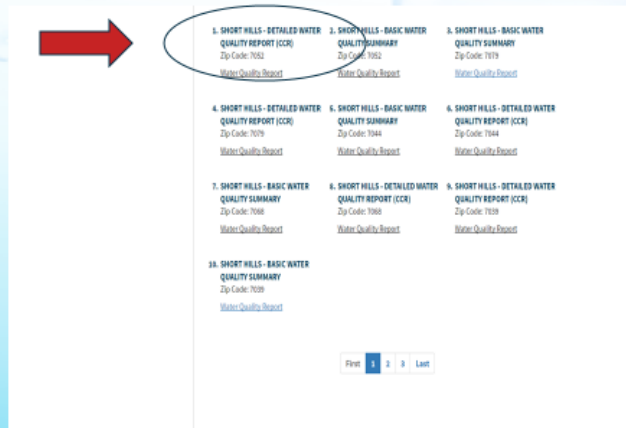
<https://amwater.com/njaw/water-quality/water-quality-reports>



3. Entrar el codigo postal de West Orange (07052) y hacer click en search



4. Seleccionar y hacer click en WATER QUALITY REPORT (CCR) y BASIC WATER QUALITY SUMMARY



5. WATER QUALITY REPORT (CCR) – Algunos contaminantes del agua:

Susceptibility Chart Definitions

Short Hills System	Sources	Pathogens			Nutrients			Pesticides			Volatile Organic Compounds			Inorganics			Radionuclides			Radon			Disinfection By-Product Precursors		
		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
	Wells – 25	1	21	3	13	12			6	19	17		8	10	11	4		25		25			3	22	
	GUDI – 0																								
	Surface Water Intakes - 4	4			2	2			2	2		4		4				4			4	4			

6. WATER QUALITY REPORT (CCR) – Algunas sustancias reguladas

Regulated Substances

Contaminant	Unit	MCL	MCLG	Range Detected	Highest Detected Level	Compliance Achieved	Typical Source
Disinfectant By-Products – Stage 2 Data							
Total Trihalomethanes (TTHM)	ppb	80	NA	11.5 – 87.7	68 ^{1,2}	YES	By-product of drinking water disinfection
Five Haloacetic Acids (HAA5)	ppb	60	NA	5.0 – 36.4	29 ¹	YES	By-product of drinking water disinfection
Bromate	ppb	10	0	ND – 2	2	YES	By-product of drinking water disinfection
Disinfectants							
Chlorine	ppm	MRDL = 4	MRDLG = 4	0.59 – 0.84	1.3 ³	YES	Water additive used to control microbes
Chloramine	ppm	MRDL = 4	MRDLG = 4	0.5 – 1.4	1.4 ³	YES	Water additive used to control microbes
Inorganic Contaminants							
Arsenic	ppb	5	0	ND – 1	1	YES	Erosion of natural deposits
Barium	ppm	2	2	ND – 0.2	0.2	YES	Erosion of natural deposits
Chromium (total)	ppb	100	100	ND – 1.9	1.9	YES	Discharge from steel and pump mills; erosion of natural deposits
Fluoride ⁴	ppm	4	4	ND – 1.0	1.0	YES	Erosion of natural deposits; Water additive which promotes strong teeth
Nickel	ppb	NA	NA	ND – 16	16	NA	Erosion of natural deposits
Nitrate ⁵	ppm	10	10	0.26 – 3.74	3.74	YES	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Selenium	ppb	50	50	ND – 0.85	0.85	YES	Erosion of natural deposits
Treatment By-Products Precursor Removal							
Total Organic Carbon	ppm	TT	NA	1.0 – 3.47	3.47	YES	Naturally present in the environment
Radiological Contaminants							
Alpha emitters ⁶	pCi/L	15	0	ND – 12.0	12.0	YES	Erosion of natural deposits
Combined Radium ⁶	pCi/L	5	0	ND – 2.1	2.1	YES	Erosion of natural deposits
Tap water samples were collected for lead and copper analysis from homes in the service area							
Lead and Copper	Unit	Action Level	MCLG	Amount Detected (90th Percentile)	Compliance Achieved	Number of Samples Above Action Level	Typical Source
Lead	ppb	15	0	3	YES	2	Corrosion of household plumbing systems; Erosion of natural deposits
Copper	ppm	1.3	1.3	0.406	YES	1	Corrosion of household plumbing systems; Erosion of natural deposits

7. BASIC WATER QUALITY SUMMARY - Informacion tipica

Parameter	Average or Range	Comments
pH	7.8 – 8.2	
Total Hardness (as CaCO ₃)	80 - 160 mg/L	Naturally occurring
Total Hardness (as CaCO ₃)	4.7 – 9.4 grains per gallon	Naturally occurring
Fluoride	ND	Naturally occurring and water additive, MCL = 4.0 mg/L
Sodium	13 - 171 mg/L	No MCL – Informational only
Iron	ND	Secondary Standard Limit = 0.3 mg/L

8. BASIC WATER QUALITY SUMMARY- (Cont...)

Parameter	Average or Range	Comments
Manganese	ND	Secondary Standard Limit = 0.05 mg/L
Type of disinfection	N/A	Chlorine
Disinfectant residual level leaving the treatment plant (average)	1.0 – 1.5 mg/L	Water additive to control microbes
Disinfectant residual level in the distribution system	0.2 – 1.0 mg/L	Max Residual Disinfectant Level Running Annual Avg. = 4.0 mg/L
Lead [90 th percentile result]	4 ug/L	Action Level = 15 ug/L
Copper [90 th percentile result]	0.486 mg/L	Action Level = 1.3 mg/L
Nitrate	0.55 – 3.8 mg/L	MCL = 10 mg/L
Arsenic	ND	MCL = 5 ug/L
Chromium-6	ND – 1.71 ug/L	Chromium-6 is not currently regulated as an individual contaminant. For more information, please visit http://www.amwater.com/njaw/Ensuring-Water-Quality/Chromium-6

9. Para encontrar la fecha de la construccion de su vivienda entrar a la siguiente pagina web:

http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=monm&passwd=data&district=1301&mode=11

10. Seleccionar Essex County, West Orange, y poner la direccion de su residencia y pulsar search

The screenshot shows a web form titled "Assessment Records Search". It contains several steps for filtering search results. Red arrows point to specific elements: the first arrow points to the "Current Owners/Assmt List" dropdown menu; the second arrow points to the "ENTER YOUR ADDRESS" input field under the "Search Criteria" section; the third arrow points to the "Submit Search" button under the "Process" section.

Assessment Records Search	
Step 1: Select Database:	Current Owners/Assmt List ▼
Step 2: Select County:	ESSEX ▼
Step 3: Select District:	WEST ORANGE ▼
Step 4: Select Search Format:	Simple Search ▼
Step 5: Select Output Format:	Single Line List Format ▼
Step 6: List Items Per Page:	50 ▼
Step 7: Select/Enter Search Criteria:	
Search Criteria	
Location:	ENTER YOUR ADDRESS
Owner Name:	
Block:	Lot: Qualifier:
Process	
Step 8: Process Search:	Submit Search Reset - New Search

11. Si el reporte muestra que su residencia fue construida antes de 1920, entonces hay una posibilidad que las cañerias esten contaminadas con plomo.



12. Si la contaminación es > 15 ppb y hay niños menores de seis años y/o mujeres. Entonces, ellos deberían ser examinados por contaminación de plomo.



13. Antes de usar el agua para consumo, dejar correr el grifo mas de un minuto.



THANKS / GRACIAS

**What's in
your
Water?**

God and Science: Water Quality Project in
West Orange, NJ.

A Presentation by
**The Rev. Miguel A.
Hernandez, D.Min.
Candidate.**

**NEW YORK
THEOLOGICAL
SEMINARY**
continuing The Biblical Seminary in New York

Holy Trinity Episcopal Church
The Episcopal Church welcomes you

**¿Qué hay en
tu
agua?**

Dios y la Ciencia: Proyecto de Calidad del
Agua en West Orange, NJ.

A Presentation by
**The Rev. Miguel A.
Hernandez, D.Min.
Candidate.**

**NEW YORK
THEOLOGICAL
SEMINARY**
continuing The Biblical Seminary in New York

Holy Trinity Episcopal Church
The Episcopal Church welcomes you

ENGLISH PRESENTATION:


UNDERSTANDING THE WATER QUALITY REPORT OF WEST ORANGE, NJ.

**BY THE REV. MIGUEL A.
HERNANDEZ**

<https://amwater.com/njaw/water-quality/water-quality-reports> (Data for 2015)

Holy Trinity Episcopal Church – Located at 315 Main St. West Orange, NJ.

Date: May 5, 2017 Time: 7:30 pm ALL ARE WELCOME!



What's in
your
Water?

God and Science: Water Quality Project in
West Orange, NJ.

A Presentation by
**The Rev. Miguel A.
Hernandez, D.Min.**
Candidate.

**NEW YORK
THEOLOGICAL
SEMINARY**
continuing The Biblical Seminary in New York

Holy Trinity Episcopal Church
The Fellowship Church tradition since 1851

1. Access the Township of the West Orange Webpage: <http://www.westorange.org>

+myConnections: Engage your community - connect to news, events and information you care about. View more information... Sign In

TOWNSHIP OF WEST ORANGE

WHERE INVENTION LIVES

NEW JERSEY

DIRECTORY GOVERNMENT AROUND TOWN DEPARTMENTS SERVICES A-Z

Search West Orange... SEARCH

ONLINE BILL PAY REPORT A CONCERN

OUTLOOK NEWSLETTER NOTIFY ME

PERMIT Information
Sign Up for Jetney Shuttle Text Alerts
Pothole Report
July 4th 2017 Weekend in West Orange
Welcome to West Orange Video

SPRING YARD WASTE CLEAN-UP GUIDELINES

Lawn & Refuse Bags
Bolsas para césped y desechos

Mar 1-May 31 by Request. [CLICK for more info](#)

NEWS & ANNOUNCEMENTS

[CLICK HERE to pay sewer bill](#)
[CLICK HERE TO PAY ONLINE](#)
**** CLICK HERE ** To Pay 2nd Quarter Tax Bill - Due May 1, 2017**
[Click Here To Pay Online](#)
Mayor Parisi's Open Office Hours 4/27
[Read on...](#)
Arbor Day Observance 4/28
[Read on...](#)

CALENDAR

April 2017

SUN	MON	TUE	WED	THU	FRI	SAT
26	27	28	29	30	31	01
02	03	04	05	06	07	08
09	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	01	02	03	04	05	06

Mon, Apr. 17
VPW Post 376 Meeting
Tue, Apr. 18
SPECIAL: Historic Preservation Commission Meeting
Wed, Apr. 19
Downtown Alliance Meeting

[VIEW ALL](#)

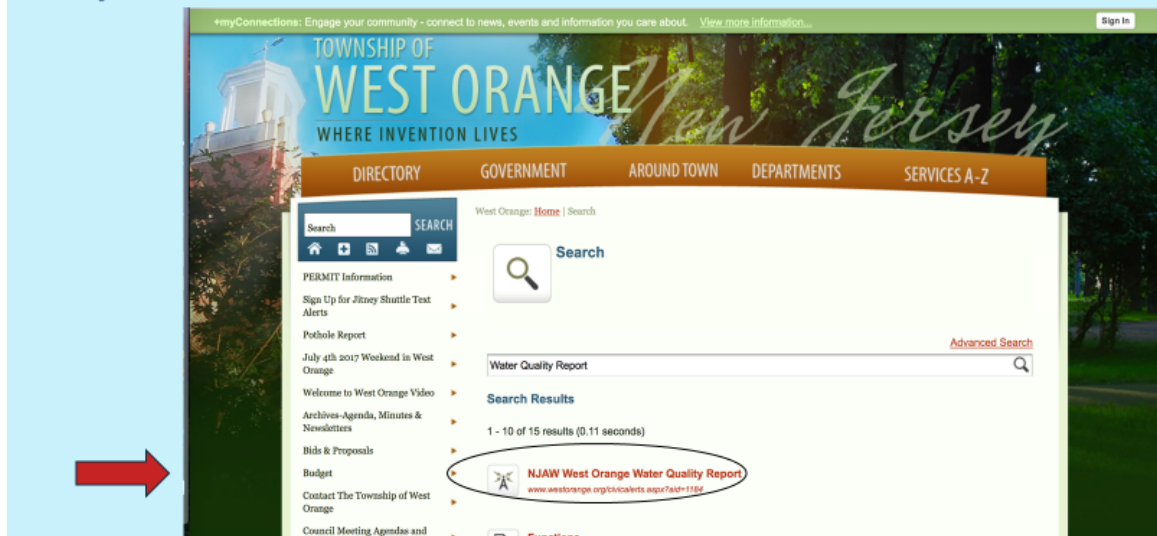
NEWS

West Orange Police Dept.

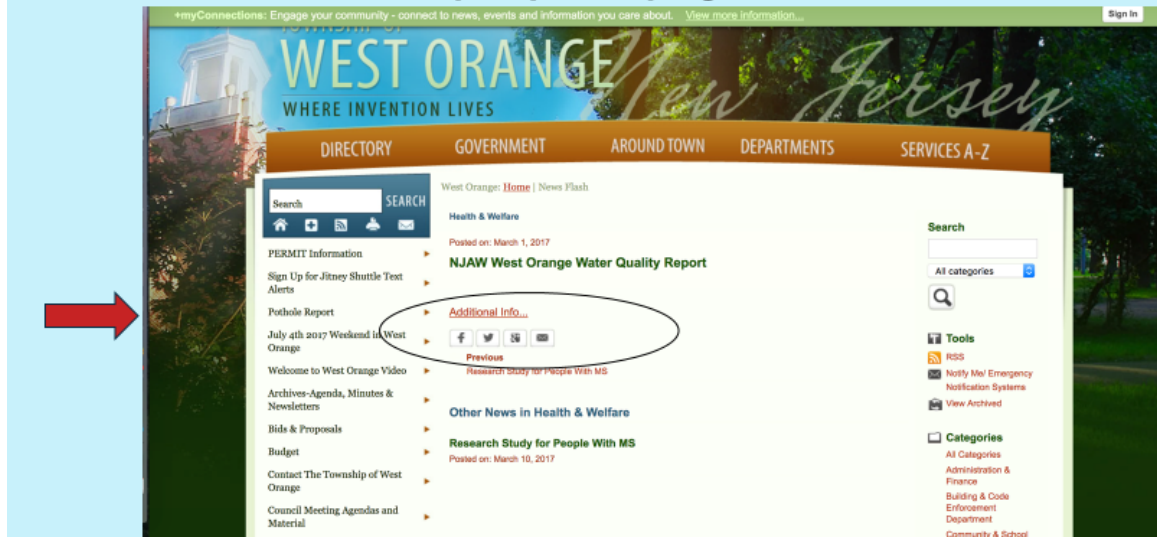
2. In the Search Box - Type Water Quality Report and Hit Return



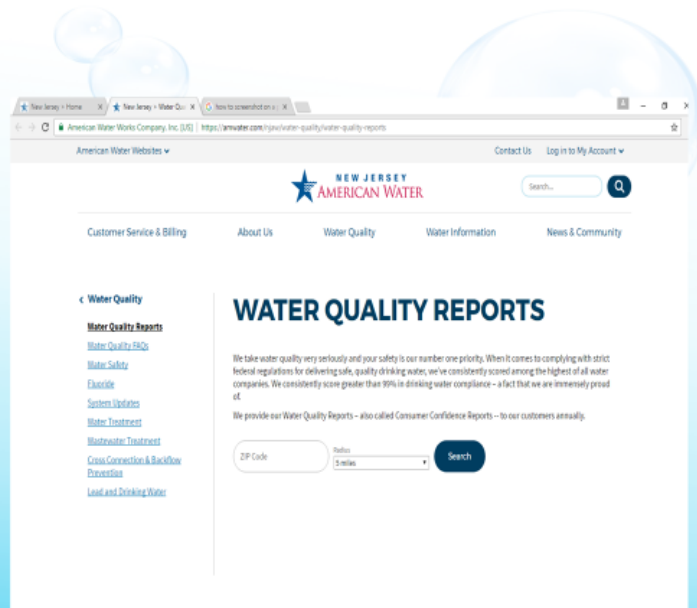
3. Select and Click: NJAW West Orange Water Quality Report



4. Click on Additional Info... To Access the NJ American Water Company Webpage:



5. This is the NJ American Water Company Webpage



6. Enter the Zip Code (07052) for West Orange and Click Search

The screenshot shows the 'WATER QUALITY REPORTS' section of the New Jersey American Water website. On the left, there is a sidebar with links: 'Water Quality Reports', 'Water Quality FAQs', 'Water Safety', 'Fluoride', 'System Upgrades', 'Water Treatment', 'Wastewater Treatment', 'Cross-Connections & Backflow Prevention', and 'Lead and Drinking Water'. The main content area has a heading 'WATER QUALITY REPORTS' and a paragraph explaining the company's commitment to water quality. Below the text is a search form with a 'ZIP Code' input field containing '07052' and a 'Search' button. A red arrow points to the 'ZIP Code' field.

7. Select and Click WATER QUALITY REPORT (CCR) and BASIC WATER QUALITY SUMMARY

The screenshot shows the search results page for the zip code 07052. It displays a grid of 10 report options. The first result, '1. SHORT HILLS - DETAILED WATER QUALITY REPORT (CCR)', is circled with a red arrow pointing to it. The second result, '2. SHORT HILLS - BASIC WATER QUALITY SUMMARY', is also circled. The grid includes report titles, zip codes, and links to 'Water Quality Report'. At the bottom, there is a pagination control showing 'First', '1', '2', '3', and 'Last'.

8. WATER QUALITY REPORT (CCR) – Some water pollutants are reported below:

Susceptibility Chart Definitions

Short Hills System		Pathogens			Nutrients			Pesticides			Volatile Organic Compounds			Inorganics			Radionuclides			Radon			Disinfection By-Product Precursors		
	Sources	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
	Wells – 25	1	21	3	13	12			6	19	17		8	10	11	4		25		25			3	22	
	GUDI – 0																								
	Surface Water Intakes - 4	4			2	2			2	2		4		4				4				4	4		

9. WATER QUALITY REPORT (CCR) – Some regulated substances

Regulated Substances

Contaminant	Unit	MCL	MCLG	Range Detected	Highest Detected Level	Compliance Achieved	Typical Source
Disinfectant By-Products – Stage 2 Data							
Total Trihalomethanes (THM)	ppb	80	NA	11.5 – 87.7	68 ^{1,2}	YES	By-product of drinking water disinfection
Five Haloacetic Acids (HAA5)	ppb	60	NA	5.0 – 36.4	29 ¹	YES	By-product of drinking water disinfection
Bromate	ppb	10	0	ND – 2	2	YES	By-product of drinking water disinfection
Disinfectants							
Chlorine	ppm	MRDL = 4	MRDLG = 4	0.59 – 0.84	1.3 ³	YES	Water additive used to control microbes
Chloramine	ppm	MRDL = 4	MRDLG = 4	0.5 – 1.4	1.4 ³	YES	Water additive used to control microbes
Inorganic Contaminants							
Arsenic	ppb	5	0	ND – 1	1	YES	Erosion of natural deposits
Barium	ppm	2	2	ND – 0.2	0.2	YES	Erosion of natural deposits
Chromium (total)	ppb	100	100	ND – 1.9	1.9	YES	Discharge from steel and pump mills; erosion of natural deposits
Fluoride ⁴	ppm	4	4	ND – 1.0	1.0	YES	Erosion of natural deposits; Water additive which promotes strong teeth
Nickel	ppb	NA	NA	ND – 16	16	NA	Erosion of natural deposits
Nitrate ⁵	ppm	10	10	0.26 – 3.74	3.74	YES	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Selenium	ppb	50	50	ND – 0.85	0.85	YES	Erosion of natural deposits
Treatment By-Products Precursor Removal							
Total Organic Carbon	ppm	TT	NA	1.0 – 3.47	3.47	YES	Naturally present in the environment
Radiological Contaminants							
Alpha emitters ⁶	pCi/L	15	0	ND – 12.0	12.0	YES	Erosion of natural deposits
Combined Radium ⁶	pCi/L	5	0	ND – 2.1	2.1	YES	Erosion of natural deposits
Tap water samples were collected for lead and copper analysis from homes in the service area							
Lead and Copper	Unit	Action Level	MCLG	Amount Detected (90th Percentile)	Compliance Achieved	Number of Samples Above Action Level	Typical Source
Lead	ppb	15	0	3	YES	2	Corrosion of household plumbing systems; Erosion of natural deposits
Copper	ppm	1.3	1.3	0.406	YES	1	Corrosion of household plumbing systems; Erosion of natural deposits

10. BASIC WATER QUALITY SUMMARY- Typical Water Quality Information

Parameter	Average or Range	Comments
pH	7.8 – 8.2	
Total Hardness (as CaCO ₃)	80 - 160 mg/L	Naturally occurring
Total Hardness (as CaCO ₃)	4.7 – 9.4 grains per gallon	Naturally occurring
Fluoride	ND	Naturally occurring and water additive, MCL = 4.0 mg/L
Sodium	13 - 171 mg/L	No MCL – Informational only
Iron	ND	Secondary Standard Limit = 0.3 mg/L

11. BASIC WATER QUALITY SUMMARY- Typical Water Quality Information (Cont...)

Parameter	Average or Range	Comments
Manganese	ND	Secondary Standard Limit = 0.05 mg/L
Type of disinfection	N/A	Chlorine
Disinfectant residual level leaving the treatment plant (average)	1.0 – 1.5 mg/L	Water additive to control microbes
Disinfectant residual level in the distribution system	0.2 – 1.0 mg/L	Max Residual Disinfectant Level Running Annual Avg. = 4.0 mg/L
Lead [90 th percentile result]	4 ug/L	Action Level = 15 ug/L
Copper [90 th percentile result]	0.486 mg/L	Action Level = 1.3 mg/L
Nitrate	0.55 – 3.8 mg/L	MCL = 10 mg/L
Arsenic	ND	MCL = 5 ug/L
Chromium-6	ND – 1.71 ug/L	Chromium-6 is not currently regulated as an individual contaminant. For more information, please visit http://www.amwater.com/njaw/Ensuring-Water-Quality/Chromium-6

12. To find out when your apartment/house was built - Click on the following link:

http://tax1.co.monmouth.nj.us/cgi-bin/prc6.cgi?menu=index&ms_user=monm&passwd=data&district=1301&mode=11

13. Select your County (Essex), District (West Orange), enter your address and submit search

The screenshot shows a web form titled "Assessment Records Search". It contains several steps for searching:

- Step 1: Select Database:** A dropdown menu with "Current Owners/Assmt List" selected. A red arrow points to this dropdown.
- Step 2: Select County:** A dropdown menu with "ESSEX" selected.
- Step 3: Select District:** A dropdown menu with "WEST ORANGE" selected.
- Step 4: Select Search Format:** A dropdown menu with "Simple Search" selected.
- Step 5: Select Output Format:** A dropdown menu with "Single Line List Format" selected.
- Step 6: List Items Per Page:** A dropdown menu with "50" selected.
- Step 7: Select/Enter Search Criteria:** This section includes:
 - Search Criteria:** A section with input fields for "Location:", "Owner Name:", "Block:", "Lot:", and "Qualifier:". The "Location:" field contains the text "ENTER YOUR ADDRESS" and is circled. A red arrow points to this field.
- Process:** A section with a "Submit Search" button circled. A red arrow points to this button.
- Step 8: Process Search:** A section containing the "Submit Search" and "Reset - New Search" buttons.

14. If the report shows that your apartment / house was built before 1920, then there is a possibility that the pipes contain lead. Then, test the water for lead contamination.




15. If the lead contamination is > 15 ppb and there are children and / or pregnant women in the house ... Then, they have to be tested for lead poisoning.



16. Before using tap water for drinking and cooking, let the water run for about a minute.



THANKS / GRACIAS





What's in
your
Water?

God and Science: Water Quality Project in
West Orange, NJ.

A Presentation by
The Rev. Miguel A.
Hernandez, D.Min.
Candidate.

**NEW YORK
THEOLOGICAL
SEMINARY**
continuing The Biblical Seminary in New York

 **Holy Trinity Episcopal Church**
The Endorsed Church welcomes you




¿Qué hay en
tu agua?

Dios y la Ciencia: Proyecto de Calidad del
Agua en West Orange, NJ.

A Presentation by
The Rev. Miguel A.
Hernandez, D.Min.
Candidate.

**NEW YORK
THEOLOGICAL
SEMINARY**
continuing The Biblical Seminary in New York

 **Holy Trinity Episcopal Church**
The Endorsed Church welcomes you

APPENDIX D – SAMPLE OF QUESTIONNAIRES

ENGLISH LANGUAGE QUESTIONNAIRE:

Please answer this Questionnaire about Water Quality and return it to one of the Team Members.

Date: _____

1. How far are you from Holy Trinity West Orange, NJ? _____

2. How many children live in your household who are less than 6 years old?

3. Is there a pregnant woman living in your household? Yes _____ No _____

4. What type of residence do you live in?

- ☐ Single family house
- ☐ Multi-family house
- ☐ Mobile home
- ☐ Apartment or apartment-style condominium

5. Do you know in what year your house or apartment was built?

Yes, it was built in _____ No _____

6. Do you know the source of your water? Yes _____ No _____

If Yes, check one:

- ☐ Town water supply
- ☐ Housing Development supply
- ☐ Own Private wells

7. What is the main source of drinking-water for members of your household?

Public tap: Yes _____ No _____

If Public tap, do you use a filter? Yes _____ No _____

Bottled water _____

Other (specify) _____

8. Do you use tap water to cook? Yes _____ No _____

9. Are you concerned about the quality of your water? (Please check all that apply)

- ☐ No
- ☐ Yes, we drink only bottled water
- ☐ Yes, we have had our well water tested during the past year
- ☐ Yes, we look at the water quality report provided by our water company
- ☐ Yes, we have our own treatment system
- ☐ Other (Please specify) _____

10. Do you know the name of the company that supplies the water to the Township of West Orange? Yes _____ No _____

11. Do you know how you can get the water report for the Township of West Orange? Yes _____ No _____

If you answered Yes, how knowledgeable are you about the interpretation of the data?

- ☐ Not knowledgeable at all
- ☐ Somewhat knowledgeable
- ☐ Knowledgeable
- ☐ Very knowledgeable

12. Do you know about the water issues in other towns like Flint Michigan and Newark, NJ? Yes _____ No _____

If you responded Yes to have some knowledge about water pollution in Flint, Michigan and Newark, NJ, how did you obtain the information?

- ☐ Personal experience
- ☐ Newspapers (online or print)
- ☐ News outlet (online or televised)
- ☐ Government reports
- ☐ Other _____

13. Are you concerned about water contamination in your home and community?

- ☐ Not concerned at all
- ☐ Somewhat concerned
- ☐ Concerned
- ☐ Very Concerned

14. How knowledgeable are you about water pollution in your community?

- ☐ Not knowledgeable at all
- ☐ Somewhat knowledgeable
- ☐ Knowledgeable
- ☐ Very knowledgeable

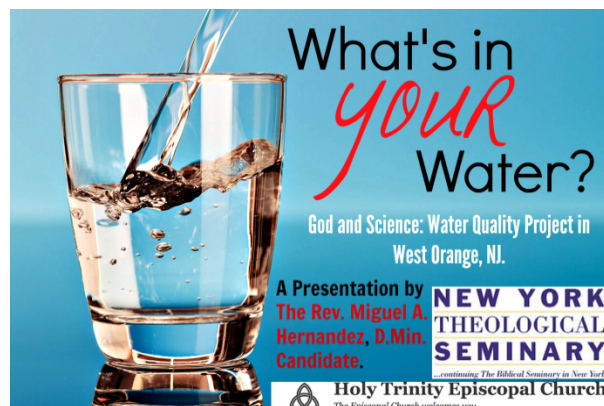
15. How knowledgeable are you about heavy metals such as mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), and lead (Pb) in your drinking water?

- ☐ Not knowledgeable at all
- ☐ Somewhat knowledgeable
- ☐ Knowledgeable
- ☐ Very knowledgeable

16. How knowledgeable are you about chemicals, pesticides, and fertilizers in your drinking water?

- ☐ Not knowledgeable at all
- ☐ Somewhat knowledgeable
- ☐ Knowledgeable
- ☐ Very knowledgeable

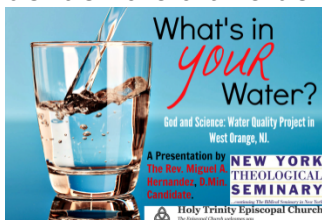
17. Please provide contact information to be invited for our next event about Water Quality in West Orange, NJ:



(Please return the Questionnaire about Water Quality to one of the Team Members -- Thanks).

SPANISH LANGUAGE QUESTIONNAIRE:

Por favor conteste este cuestionario sobre la Calidad del Agua y devuélvalo a uno de los miembros del equipo.



Fecha: _____

1. ¿Qué tan lejos vive de la Iglesia la Trinidad (*Holy Trinity*) en West Orange, NJ?

2. ¿Cuántos niños viven en su hogar que tienen menos de 6 años de edad?

3. ¿Hay una mujer embarazada viviendo en su hogar? Si ____ No ____

4. ¿En qué tipo de residencia vive usted?

☐ Casa unifamiliar

☐ Casa multifamiliar

☐ Casa móvil

☐ Apartamento o condominio de estilo apartamento

5. ¿Sabe usted en qué año se construyó su casa o apartamento?

Sí, fue construido en _____ No _____

6. ¿Conoce la fuente de su agua? Si ____ No ____

En caso afirmativo, marque uno:

☐ Suministro de agua de la ciudad

☐ Oferta de Desarrollo de Vivienda

☐ Poseemos pozos privados

7. ¿Cuál es la principal fuente de agua potable para los miembros de su hogar?

Agua potable pública: Sí ____ No ____

Si Pública, ¿utiliza un filtro? Si ____ No ____

Agua embotellada _____

Otra especificar) _____

8. ¿Utiliza agua potable pública para cocinar? Si ____ No ____

9. ¿Le preocupa la calidad de su agua? (Por favor marque todos los que apliquen)

- ☐ No
- ☐ Sí, solo bebemos agua embotellada
- ☐ Sí, hemos tenido nuestra prueba de agua de pozo durante el año pasado
- ☐ Sí, miramos el informe de calidad de agua proporcionado por nuestra compañía de agua
- ☐ Sí, tenemos nuestro propio sistema de tratamiento
- ☐ Otro (especifique) _____

10. ¿Conoce usted el nombre de la empresa que suministra el agua al municipio de West Orange? Si _____ No _____

11. ¿Sabe cómo puede obtener el reporte de agua para el municipio de West Orange? Si _____ No _____

Si respondió "Sí", ¿Está usted informado sobre la interpretación de los datos?

- ☐ No lo se en absoluto
- ☐ Algo informado
- ☐ Conocimientos generales
- ☐ Muy bien informado

12. ¿Conoce los problemas de agua en otras ciudades como Flint, Michigan y Newark, NJ? Si _____ No _____

Si respondió Sí de tener algún conocimiento sobre la contaminación del agua en Flint, Michigan y Newark, NJ, ¿cómo obtuvo la información?

- ☐ Experiencia personal
- ☐ Periódicos (en línea o impresos)
- ☐ Canal de noticias (en línea o televisado)
- ☐ Informes del gobierno
- ☐ Otro _____

13. ¿Le preocupa la contaminación del agua en su hogar y comunidad?

- ☐ No estoy preocupado
- ☐ Algo preocupado
- ☐ Preocupado
- ☐ Muy preocupado

14. ¿Cuánto sabe usted acerca de la contaminación del agua en su comunidad?

- ☐ No lo se en absoluto
- ☐ Algo bien informado
- ☐ Conocimientos generales
- ☐ Muy bien informado

15. ¿Cuánto sobre metales pesados como el mercurio (Hg), cadmio (Cd), arsénico (As), cromo (C

- ☐ No lo se en absoluto
- ☐ Algo bien informado
- ☐ Conocimientos generales
- ☐ Muy bien informado

16. ¿Qué tan bien informado esta acerca de los productos químicos, pesticidas y fertilizantes en el agua potable?

- ☐ No se en absoluto
- ☐ Algo bien informado
- ☐ Conocimientos generales
- ☐ Muy bien informado

17. Proporcione la información de contacto que será invitada para nuestro próximo evento sobre Calidad del Agua en West Orange, NJ:

APPENDIX E – SAMPLE OF ADVERTISEMENT

SPANISH LANGUAGE ADVERTISEMENT:

ENTENDIENDO EL REPORTE DE LA CALIDAD DEL AGUA DE WEST ORANGE, NJ.

**POR EL REVDO. MIGUEL
A. HERNANDEZ**

<https://amwater.com/njaw/water-quality/water-quality-reports> (Data for 2015 - 2016)



Holy Trinity Episcopal Church – Localizada en 315 Main St. West Orange, NJ.

Date: Junio 4, 2017

Time: 2:00 pm

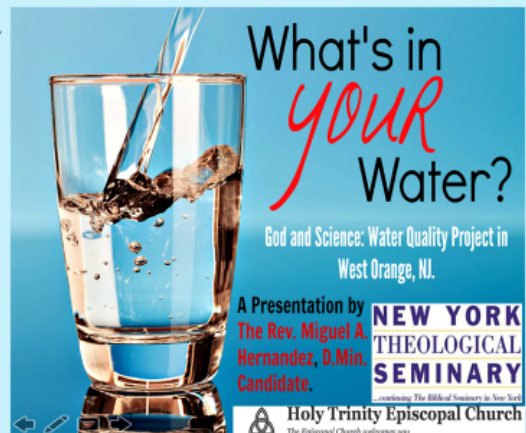
TOD@S SON BIENVENID@S

ENGLISH LANGUAGE ADVERTISEMENT:

UNDERSTANDING THE WATER QUALITY REPORT OF WEST ORANGE, NJ.

**BY THE REV. MIGUEL A.
HERNANDEZ**

<https://amwater.com/njaw/water-quality/water-quality-reports> (Data for 2015)



Holy Trinity Episcopal Church – Located at 315 Main St. West Orange, NJ.

Date: May 5, 2017

Time: 7:30 pm

ALL ARE WELCOME!

Bibliography

- Ball, Jim. *Global Warming and the Risen Lord: Christian Discipleship and Climate Change*. Washington, DC: Evangelical Environmental Network, 2010.
- Barbour, Ian G. *Issues in Science and Religion*. New York: Harper & Row, 1971.
- Betto, Frie. *Fidel y La Religión: Conversaciones Con Frei Betto Sobre El Marxismo y La Teología de La Liberación*. Buenos Aires: Ocean Sur, 2006.
- Boff, Leonardo. *Salvation and Liberation*. Maryknoll, NY: Orbis Books, 1984.
- Cooper, Morton. *Change Your Voice, Change Your Life: A Quick, Simple Plan for Finding and Using Your Natural, Dynamic Voice*. New York: Barnes & Noble, 1985.
- Cross, F L., and Elizabeth A. Livingstone, eds. *The Oxford Dictionary of the Christian Church*. 2nd ed. London: Oxford University Press, 1974.
- Damasio, Antonio R. *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*. New York: Harcourt Brace, 1999.
- Davies, P. C. W. *The Mind of God: The Scientific Basis for a Rational World*. New York: Simon & Schuster, 1992.
- Davis, Kortright. *Serving with Power: Reviving the Spirit of Christian Ministry*. New York: Paulist Press, 1999.
- Dehaene, Stanislas. *The Number Sense: How the Mind Creates Mathematics*. New York: Oxford University Press, 1997.
- Fagan, Joseph. *Stories of West Orange*. American Chronicles (Series). Charleston, SC: The History Press, 2014.
- Ferguson, Kitty. *Pythagoras: His Lives and the Legacy of a Rational Universe*. London: Icon, 2011.
- Freire, Paulo. *Pedagogy of the Oppressed*. 30th ed. New York: Continuum, 2000.
- Glaeser, Edward L. *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier*. New York: Penguin Press, 2011.
- González, Justo L., and Jiménez, Pablo A. *Púlpito: An Introduction to Hispanic Preaching*. Nashville, TN: Abingdon Press, 2005.

- Guthrie, Donald, and J. A. Motyer. *The Eerdmans Bible Commentary*. 3rd ed. Grand Rapids, MI: W. B. Eerdmans, 1987.
- Gutiérrez, Gustavo. *On Job: God-Talk and the Suffering of the Innocent*. Maryknoll, NY: Orbis Books, 1987.
- Hastings, Adrian, ed. *A World History of Christianity*. Grand Rapids, MI: W. B. Eerdmans, 2000.
- Herzog, William R. *Parables as Subversive Speech: Jesus as Pedagogue of the Oppressed*. Louisville, KY: Westminster/John Knox Press, 1994.
- Hinson, E. Glenn. *The Early Church: Origins to the Dawn of the Middle Ages*. Nashville: Abingdon Press, 1996.
- Hunter, George G. *Church for the Unchurched*. Nashville: Abingdon Press, 1996.
- Lassiter, Valentino. *Martin Luther King in the African American Preaching Tradition*. Cleveland: Pilgrim Press, 2001.
- Lennick, Doug. *Moral Intelligence: Enhancing Business Performance and Leadership Success*. Upper Saddle River, N.J.: Wharton School, 2005.
- Macionis, John J., and Vincent N. Parrillo. *Cities and Urban Life*. 3rd ed. Upper Saddle River, NJ: Pearson Education, 2004.
- Mays, James Luther. *Harper's Bible Commentary*. San Francisco: Harper & Row, 1988.
- Metzger, Bruce M., and Michael David Coogan, eds. *The Oxford Companion to the Bible*. New York: Oxford University Press, 1993.
- Norberg, Johan. *In Defense of Global Capitalism*. Washington, DC: Cato Institute, 2003.
- Northouse, Peter Guy. *Leadership: Theory and Practice*. 7th ed. Los Angeles: SAGE, 2015.
- O'Connor, Joseph, and Ian McDermott. *The Art of Systems Thinking: Essential Skills for Creativity and Problem Solving*. London: Thorsons, 1997.
- Pasternak, Charles A. *Quest: The Essence of Humanity*. Chichester, UK: Wiley, 2003.
- Penrose, Roger. *The Road to Reality: A Complete Guide to the Laws of the Universe*. New York: Vintage, 2007.
- Peurifoy, R. L. *Construction Planning, Equipment, and Methods*. 4th ed. McGraw-Hill Series in Construction Engineering and Project Management. New York: McGraw-Hill, 1985.

- Prichard, Robert W. *A History of the Episcopal Church*. Rev. ed. Harrisburg, PA: Morehouse, 1999.
- Proctor, Samuel D. *Preaching About Crises in the Community*. Philadelphia: Westminster Press, 1988.
- Schumacher, E. F. *Small Is Beautiful: Economics as If People Mattered*. New York: Perennial Library, 1975.
- Shiva, Vandana. *Water Wars: Privatization, Pollution, and Profit*. Berkeley, CA: North Atlantic Books, 2016.
- Singer, Peter. *Animal Liberation*. 2nd ed. New York: New York Review of Books, 1990.
- Smith, Donald P. *How to Attract and Keep Active Church Members*. Louisville, KY: Westminster/John Knox Press, 1992.
- Stern, Caryl M. *I Believe in Zero: Learning from the World's Children*. New York: St. Martin's Press, 2013.
- Water History for Our Times.
<http://unesdoc.unesco.org/images/0021/002108/210879e.pdf> (accessed July 27, 2017).
- Weart, Spencer R. *The Discovery of Global Warming*. Cambridge, MA: Harvard University Press, 2003.